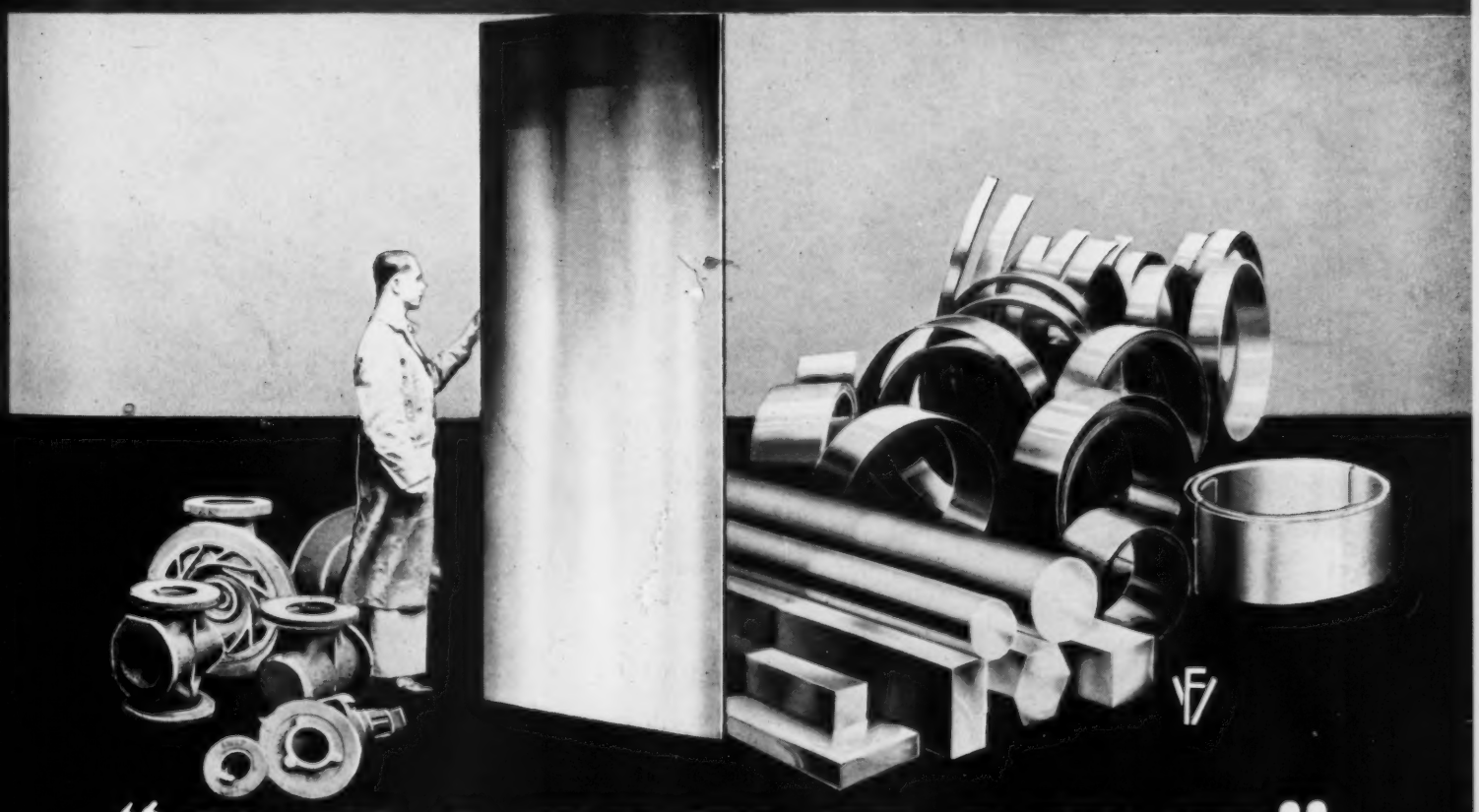
D MANUFACTURE

FOOD MANUFACTURE

LISHERS: LEONARD HILL LIMITED, 17, STRATFORD PLACE, LONDON, W. 1 MAY, 19



"STAYBRITE"
REGD TRADE MARK
SUPER STAINLESS STEEL

THE IDEAL METAL FOR FOOD MANUFACTURING PLANT

FIRTH-VICKERS STAINLESS STEELS LTD.. SHEFFIELD. 9.

THROUGH THE TROPICS

Are you sure your products reach your customers on the other side of the world in the same condition in which they leave your factory?

The African Canning and Packing Corporation of South Africa ensure that theirs do by using caps lined with

GOLD SEAL CAP COMPOUND

The gasket which never perishes—holds a vacuum for years—does not fall out of the cap and permits caps to be carried in stock from season to season.

Write to your Cap Manufacturer or to us for particulars

DEWEY AND ALMY LIMITED

SHELL-MEX HOUSE - STRAND - LONDON - W.C.2

TELEPHONE : TEMple Bar 1410

TELEGRAMS : DAREXENG, RAND, LONDON

A JOURNAL DEVOTED TO THE PRODUCTION AND MANUFACTURE OF ALL EDIBLE COMMODITIES INVOLVING A PROCESS OF MANUFACTURE.

FOOD MANUFACTURE

Incorporating Canning, Packing and Preserving.

VOLUME . . . XIV

NUMBER . . . 5

MAY . 1939

Colours and Flavour Number

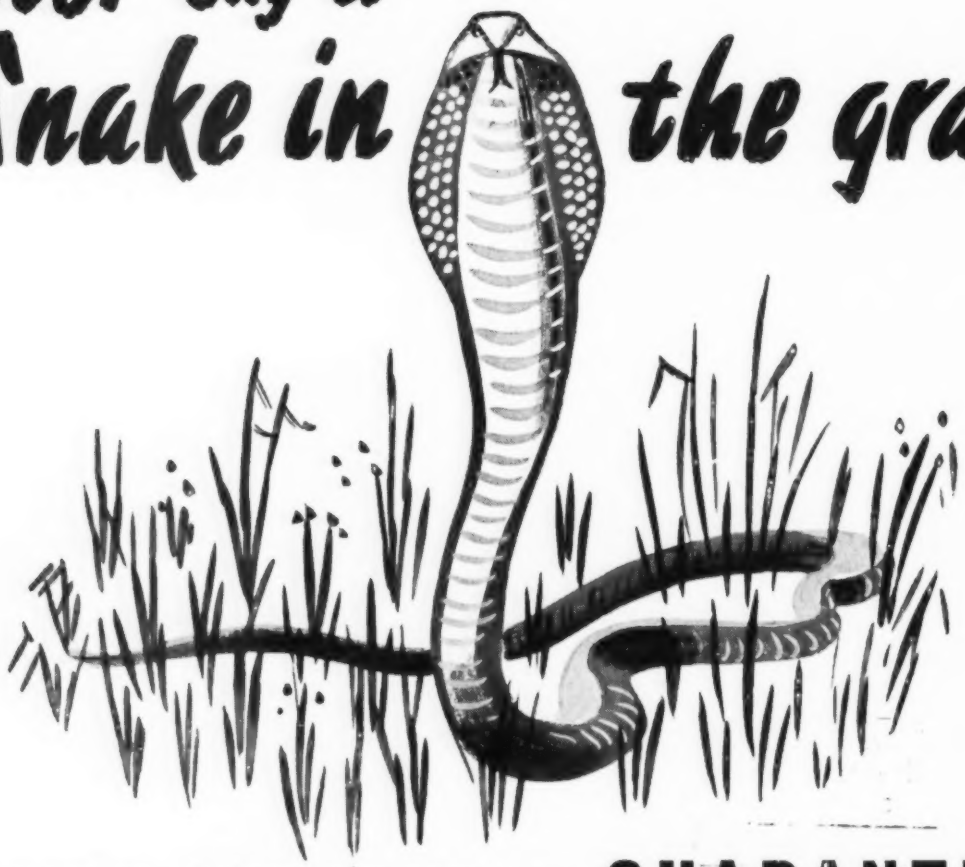
CONTENTS

	PAGE
Editor's Comments	147
Apple Juice and Fruit Syrups	151
Marmalade Making by Modern Methods. *T. Crosbie Walsh, F.I.C.*	156
The Washing of Glass Containers. *H. A. H. Crowther, F.C.S.*	161
Kent Apple Growers make Co-operation their Aim.	165
Jam. *E. F. Eaton, A.I.C.*	167
Magnetic Separators avoid Metallic Contamination in Foods. *H. E. Hutter*	170
Fruit Pulp	172
Book Reviews	173
Correspondence	174
News from the Industry	175
Information and Advice	179
Recent Patents	181
Trade Marks and New Companies	182

Published on the first day of every month by Leonard Hill Limited, 17, Stratford Place, London, W. 1. Telephone: Mayfair 7383 (Private Branch Exchange). Annual Subscription, 10s.; Abroad, 12s. 6d.; Single copies, 1s.

The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

Never buy a Snake in the grass



OR SALT WITHOUT A GUARANTEE

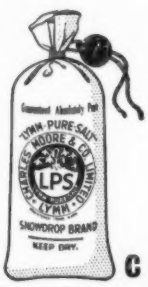
In a naughty world things are seldom what they seem. So never buy salt without a guarantee of purity. Not just a promise ; not a verbal guarantee, but a written one, clear, concise and unequivocal. Insist in fact on a signed guarantee like this*, which you will receive in black and white with every bag of 'Lymm-Pure-Salt', and which is given with no other salt.

* **SIGNED GUARANTEE OF PURITY**

"We guarantee our 'LYMM-PURE-SALT' to be absolutely Pure Salt, containing 99.98% Sodium Chloride on dry sample. It contains no SULPHATE OF LIME (Plaster of Paris), Sulphate of Magnesia, Chloride of Magnesia, Chloride of Barium, SULPHATE OF SODA or any adulteration." *Charles Moore & Co. Ltd.*

'LYMM-PURE-SALT'

GUARANTEED 99·98% PURE



★ SNOWDROP BRAND ★

See that you see the Guarantee on every invoice for salt

CHARLES MOORE & COMPANY LIMITED · LYMM CHESHIRE

ALL ENQUIRIES TO SALES MANAGERS — Honeywill & Stein Ltd., 21 St. James's Square, London, S.W.1.

FOOD MANUFACTURE

Vol. XIV, No. 5 May, 1939

British Fruit Juices

A PERIODICAL and accurate reckoning of progress in connection with almost anything is a healthy procedure, clearing the way, as it should, for a general tidying up. This applies especially to a new industry whose growing pains, inhibiting proper prospective, may well induce the traversing of blind alleys and the following of lines of least resistance.

Not that there was the slightest sign of youthful pains at the conference at Long Ashton on March 23, an account of which we give in this issue. Not even any uncomfortable delving into reasons why this country, blessed with ample raw material, should have lagged so much behind other European countries in the matter of pure fruit juices. We do not pretend to understand the phenomenon of the " putting over " of a new product without advertising, as is alleged to have been done in Germany and elsewhere. To the suggestion that some kind of moral suasion might have been applied, our reaction may be defined by the proverb, " You can take a horse to water but you can't make him drink ".

We learned at Long Ashton that technical difficulties may be almost entirely discounted, and that there is every prospect of methods of manufacture being so simplified that the product may be cheapened. The stuff we sampled—there were five different brands—was excellent in every case. Their composition, as shown by chemical analysis, convinces us that fruit drinks have definite nutritive properties and are readily assimilable. There was presented sufficient evidence at least to suggest valuable medicinal qualities, and further tests may conceivably disclose surprising ones in this connection. Incidentally, we were a little disgruntled to hear from Dr. Taylor in his introductory speech that the different medical associations, although invited to do so, had not sent delegates. Perhaps in these days, when an amazing selection of eatables and drinks are being offered as veritable elixirs of life, the medical profession may be a little shy of the danger of becoming an unofficial sales organisation for any given product. But it would not have done some of its official representatives any harm to have heard about the cases cited by Mr. Charley in his address.

To capitulate: the British fruit juice baby has been born and weaned. Technically, dietetically, and in some degree medically, it is in fine fettle. And now what? Apart from the larger stores, where can it be bought? In how many *cafés*, restaurants, teashops, much less licensed houses, can it be consumed? " Nor all the Piety nor Wit " of the scientists will sell a single bottle or a single can of it. But they have done their part of the job, and it is now up to the salesman and the propagandist. The best of luck to them, for the stuff is good.

A Food Defence Minister

Sir Arthur Salter, whose views on food storage are well known, asked the Prime Minister on March 23 whether he would arrange for the primary responsibility for policy as to food reserves to be assigned to a Minister. This would place the provision of food supplies in much the same category as the maintenance of supplies of battleships, aeroplanes or army units.

The Prime Minister did not commit himself at the time, but he did say that he had been considering the matter but had not reached a final decision. However, we were pleased to note that within a few days he had made up his mind and an appointment.

On April 6 the Prime Minister announced that Mr. W. S. Morrison, Chancellor of the Duchy of Lancaster and formerly Minister of Agriculture, was to become Minister in charge of the Food (Defence Plans) Department. We welcome this step as we have always felt that the provision and distribution of food supplies in times of emergency are far too important matters to be regarded as side lines of the Board of Trade. The primary

responsibility for policy as to food reserves now will rest with the Minister in charge of the Department which carries out that policy. The Board of Trade will be busy enough with its many other activities, and now, presumably, food supply will receive appropriate and adequate attention.

We believe that the choice of Mr. Morrison is a good one. He was not a success at the Ministry of Agriculture, but neither was Mr. Elliot, and he seems to have turned into an excellent Minister of Health. In any case Mr. Morrison is helping Lord Chatfield, Minister for the Co-ordination of Defence, and he represents that Minister in the Commons. The move kills two birds with one stone. It places food supply in a much stronger position by giving it a Minister of its own. It also provides Mr. Morrison with a definite job instead of being at a loose end in the Cabinet.

Safer Milk

The purity of our national milk supply is a matter of paramount importance. When the Government issued a white paper in July, 1937, we thought that at long last something tangible was to be done to safeguard our milk supply albeit that the proposals were only partial and faltering.

The Government's view expressed in that paper was that an essential step towards an increased milk consumption was to establish public confidence in the cleanliness and purity of the milk supply, and it was this sentiment, together with the Government's undertaking to introduce legislation enabling local authorities to apply for an order requiring efficient pasteurisation, that inspired general confidence.

In due course there appeared the Milk Industry Bill, and, as we pointed out at the time, it had a very rough passage in the House and was withdrawn "for reconsideration". Many items in a necessarily long and complicated Bill were unpopular, probably the most so being the pasteurisation proposals.

So far we have had no indication of the forms the new Bill will take. It is doubtful, even, if the Government will make another essay on a difficult journey. As far as can be gathered, however, the general opinion in agricultural circles is that in the new Bill, if any, the pasteurisation proposals will be dropped. Pressure on the other side has not been relaxed, and since the Bill was withdrawn two important deputations have waited on the Minister of Health.

On February 8 representatives of the British Medical Association, the Royal Colleges, the Society of Medical Officers of Health, and the Joint Tuberculosis Council had their say. On February 24 a deputation under the auspices of the People's League of Health put forward its views. Briefly, both deputations made it clear that the medical profession has made a scientific study of milk and, as a result, is agreed that pasteurisation is necessary to protect the milk supply.

The position is intriguing. Will the Government ignore expert and medical opinion because of the pressure brought to bear by a small section of the milk industry, or will they be firm and steadfast in producing a measure that will really enforce the supply of pure and safe milk? We all believe that the future of the milk industry depends on increased consumption, but no one can advocate the supply of a bacteria-laden beverage, the increased consumption of which might do incalculable harm to the public health. If the Government ignore this expert medical opinion it will be unpardonable —more unpardonable still if they shirk the issue and shelve the matter altogether.

Storage of Eggs

It seems to be a law of nature that the habits of the domestic hen result in an abundance of eggs in April and a scarcity in November. At a result of the laws of supply and demand the prices vary in inverse ratio to the supply.

One of the important problems of egg economics is to be in a position to buy eggs in April for consumption in November. Cold storage of eggs has long been practised in America, but has not found much favour in this country. There are now distinct signs of a renewed interest in this problem among our own scientific researchers and Dr. Moran has recently discussed the advantages and disadvantages of cold storage and gas storage. In this particular work he does not deal with the "pickling" processes, either with sodium silicate or the more modern organic sealing solutions. These are not suitable for large-scale usage and are of purely domestic interest.

It is well known that an egg begins to change from the time of laying, and this change is very marked if the eggs have been fertilised. For storage purposes unfertilised eggs are preferable. If eggs are stored in a dry atmosphere they dry and contain a larger air space, the whites shrink and liquefy. We referred to the question of watery white of egg in these notes as long ago as March, 1933, and said then that "researches are now in

progress, we understand, at Cambridge to investigate this interesting subject". This work, published by the Department of Scientific and Industrial Research, is the outcome of these investigations.

Storage Conditions

Eggs stored in a dry atmosphere develop the watery white and weakening of the yolk, and, apart from becoming unpalatable, suffer an alteration in physical characteristics that affects their behaviour when boiled or poached. Cold storage at 29° to 32° F., with control of humidity only, allows increase of the air cell and yellowing of the white, the yolk becomes flabby and a storage taste develops which shows up particularly in boiled eggs. It is, however, satisfactory for storage not exceeding five months, but not enough for a satisfactory carry over from April to November. Partial gas storage, in an atmosphere containing 2 to 2½ per cent. carbon dioxide, with control of humidity, is more satisfactory.

After nine months the yolk is firm, and there is no storage taste, but the white still becomes rather yellow and the air cell is large. Full gas storage with 60 to 100 per cent. CO_2 and no control of humidity prevents enlargement of the air cell since the atmosphere is saturated with moisture, but the thin part of the white is watery and the thick part shrunken. Both gas storage methods result in roughening of the shell. Ozone, up to one part in a million, slightly delays the appearance of storage taste in the yolk, but larger amounts produce a metallic or cucumber flavour.

For most purposes eggs stored by these methods for nine months should be reasonably satisfactory, but the epicure with the fastidious palate will detect the little bit of something that shouldn't be there and will prefer his boiled or poached egg to be new-laid no matter what the price may be.

School Meals

The President of the Board of Education recently received a deputation from the Children's Minimum Council, who submitted a statement on school meals and milk.

According to the deputation the supply of these extras does not go far enough, and the need was urged for a far more generous provision when the school-leaving age is compulsorily increased without maintenance grants.

The proposals included the provision of a daily ration of milk free to all children at elementary and State-aided schools. It was further suggested that local authorities should be required to make provision for a mid-day meal at all their schools. It was also urged that meals should be provided free for children coming from families in which the money available for food falls below a scale laid down by the Board in accordance with modern scientific requirements. The final proposal was that the Board should enforce proper standards of accommodation, service and dietary.

We quite agree with all this in principle and feel that it is just as rational to feed children for nothing as to teach them without charge, but there is a limit to all expenditure. Lord De La Warr said that pressure is being brought to bear on backward authorities, but financial reasons (apart from any others) make the Council's proposals unrealisable at the present time.

The time may come when the State will relieve parents of any obligations in regard to the upbringing of their offspring and will feed, clothe, house and educate children and just hand them over when they are trained wage-earning units. In the meantime, however, money is scarce, and the Children's Minimum Council will do well to remember that half a loaf is better than no bread.

Grain Pests

In view of the necessity for the increased storage of cereals and cereal products an intimate knowledge of the pests which may infest grain is essential.

A survey of the extent of infestation of stored grain was carried out last year by Professor Munro, of the Imperial College, on behalf of the Department of Scientific and Industrial Research. The survey was undertaken with the co-operation of the industries concerned.

The Department has now published a leaflet on the subject entitled "Pests of Grain" at the price of threepence, and everyone interested or involved in the storage and handling of grain should obtain a copy. To combat serious infestation the use of specialised technical methods is required, but in the common storage of grain and grain products for short periods on farms and in warehouses the damage done by insects may be greatly reduced by reasonable attention to simple principles of warehouse hygiene.

Professor Munro's survey disclosed a lack of knowledge of these simple principles and the leaflet just published, by describing briefly the most common grain pests with simple but effective means of keeping them in check, will assist all con-

cerned with the storage of grain. Complementary to the leaflet is published a chart suitable for hanging in warehouses or barns and summarising the information given in the leaflet. The diagrams given are extremely good, and the leaflet is a most valuable contribution to the study of pests of stored grain.

Fuel Oil for Bakery Ovens

An interesting series of tests has been carried out in France by Dr. André Kling and Professor Marc Tiffeneau of the Academy of Medicine on fuels for the heating of ovens. The purpose of these tests was to determine the effects of the use of oil, particularly as regards the flavour of the bread and its content of sulphur.

The tests were carried out in three bakeries, one of which uses oil as a normal method of heating, the second of which uses coal and the third wood. In each case the oven was heated up in the usual manner, then cleaned out with a wet swab, and a sample of the oven air taken before the bread was introduced. Tests were made in the usual way on the air sample to determine its sulphur dioxide content and to determine the percentage of unburned gases present.

The content of unburned gases was determined by testing the CO_2 content of the furnace air simultaneously with the CO_2 content of the same air after it had been heated to 850° C. by passing through a small electric furnace. A brick from the oven lining was removed for analysis.

Reporting the results of their tests, the experimenters insist that the odour of oil was certainly not present in the bakery during the heating of the oven. There was, moreover, no occasion for accidental contact of the bread with oil, so that there seems no reason why the bread should take on an oily flavour. Samples of bread baked were also examined, and no traces of oily flavour were found.

These tests would seem to show that fuel oil is perfectly suitable as a fuel for heating bakery ovens, contrarily to the opinion which has been given widespread publicity in France. Not only does it leave no trace of odour or flavour in the bread, but also introduces actually less sulphur than wood. What the reason for this is, Kling and Tiffeneau made no attempt to determine. They suggest the hypothesis, however, that it is due to the lower combustion temperature of the wood which may permit a less complete reaction of the sulphur.

The results of the analyses show that with oil the unburned gases were not appreciably higher than with coal. The SO_3 on the inner face of the brick was four times as much with coal as with oil. With wood there were great differences in the SO_3 content on the brick. It amounted to twenty-four times that of oil. The CO_2 content of the oven air was also notably higher.

Food Standards

The lamentable state of our food laws was again emphasised by a case reported in the April 14 issue of our contemporary, *Food Industries Weekly*. For supplying sausages which did not contain 50 per cent. meat, a firm was fined £5 at St. Helens. The sausages were found to be 23 per cent. deficient in meat content. Although there was no legal standard laid down, 50 per cent. meat content was accepted in that Court so long ago as 1921. That it was considered worth while to put up the defence that in many towns, including Hull and London, the accepted standard of meat content was lower than 50 per cent., further accentuates the random nature of the regulations. In his letter published in this issue, Mr. Leonard Feltham draws attention to the confusion which exists in the ice-cream trade. Food laws should be made to be applied, not (except perhaps in very exceptional cases) interpreted according to the "taste and fancy" of the local authority. Also, as far as sausages are concerned, what's not good enough for St. Helens should not be good enough for London and Hull.

Wheat-Germ Oil and Vitamin E

The discussion on the clinical uses of vitamin E, which took place recently in the Section of Therapeutics and Pharmacology of the Royal Society of Medicine, was not characterised by undue optimism on the part of the experts. Professor F. J. Browne, of University College Hospital, said that the reports of various workers showed that the use of wheat-germ oil in cases of habitual abortion was followed by 75 to 80 per cent. of successes. Other methods, however, had given equal and even better results. Professor Browne agreed with Wilbur, who had said that the necessity for vitamin E for normal embryonic growth in animals, other than the rat and the mouse, had not been established.

Mr. A. L. Bacharach thought that with the availability of pure tocopherol and of chemical tests for its estimation, rapid progress should be made.

APPLE JUICE & FRUIT SYRUPS

British scientists have solved manufacturing problems: next steps are standardisation of products, their popularisation, and medical and nutritional studies. These were matters discussed at the Conference at Long Ashton.

A New British Industry

OF CONSIDERABLE importance to the British fruit juice industry was the conference called by the Department of Agriculture and Horticulture of the University of Bristol and held at Long Ashton on March 23 under the chairmanship of Dr. H. V. Taylor, Commissioner for Horticulture, Ministry of Agriculture and Fisheries.

A large and representative gathering of fruit growers, chemists and industrialists listened to the four addresses, covering separate aspects of the industry, which were delivered during the day. During the lunch interval, opportunity was given for the inspection of different processes, carried out on a semi-industrial scale, and enabling those interested to follow the different stages of apple juice preparation from start to finish.

Professor Barker's Address

Professor B. T. P. Barker, M.A., Director of the Long Ashton Research Station, in tracing cider-making research up to the establishment of the National Fruit and Cider Institute at Long Ashton in 1903, said that, having come into existence through cider and having been continuously engaged in investigations associated with this fruit product and its raw material during thirty-six years, the Long Ashton Station might fairly claim a direct interest in fruit products as a subject. But it was with a wider field that the Station was concerned, and it had been felt desirable to call the present conference to report progress and to consider the position of the young pure fruit juice and syrup industry.

The Long Ashton Laboratories.

Mr. V. L. S. Charley pouring out a glass of one of his syrups for Dr. H. V. Taylor at the University of Bristol Research Station before the Conference. Professor B. T. P. Barker, director of the station, is on left. Standing on steps are Capt. D. M. Wills (left) and Mr. C. P. Norbury

In connection with the by-products of the cider industry, the experiments on pressed pomace and alternative uses for cider apples were matters out of which arose the development of fruit juices. It was interesting to note that one of the earliest problems on which the Station was asked to advise was a sample of "non-alcoholic cider", the methods of preparation of which corresponded in practically all essential details with those now adopted in our English apple juice production.

Professor Barker proceeded to trace the march of research along the years. The Great War gave a new turn to the work and simple methods of vegetable and fruit preservation and home-canning were studied. From this beginning there developed two important schemes for which Long Ashton was mainly responsible. The first was the Campden Research Station and the second was instruction and research on the Domestic Preservation of Fruits and Vegetables, the headquarters of which are still at Long Ashton.

One of the major post-war issues was the necessity for improvement of the quality of fruit for culinary and dessert use which the English commercial fruit grower sent to the market. It was his only chance of competing with overseas imported material. That led to higher standards of grading and packing, and an outlet had to be found for fruit below those grades. Due to the large expansion of commercial apple growing, the cider industry could not absorb all the production of apples below the grade for marketing as such.

Thus was born the apple juice industry, and the first pure fruit syrup factory in Great Britain was established in Bristol—that of Messrs. H. W. Carter and Co., Ltd.

Professor Barker gave due credit to the Metal Box Company for conjoint investigations on fruit juices, and also to the Aluminium Plant and Vessel Company for provision of equipment installed at Long Ashton.

Fruit Juice Standardisation

"At the present time there are beverages being sold under the name of apple juice which call for regulation to protect the purchaser, and if, as we hope, unfermented apple juice is to take its rightful place in the diet of the nation, it is of utmost importance that the product is absolutely pure and healthy and standardised, and can in no way be confused with a synthetic juice." This was the thesis of Mr. Christopher P. Norbury's address, which followed Professor Barker's.

Unfermented apple juice is "just apple juice", but it is naturally more expensive than a coloured water with a little fruit essence added to it—a product which is so tempting for an unscrupulous manufacturer to prepare.

The confidence which the beverage had won with the consumer in Germany was no doubt due to the adoption of fixed standards of quality from the very inception of the industry. Rigid standards were also in existence in Switzerland, and in both these countries the product had the backing of the majority of the medical profession.

The fruit juice industry in England is determined to get standards adopted. The National Farmers' Union has formed a sub-committee to draft actual definitions in co-operation with them. Referring again to the German industry, the speaker said that in 1938, 30 per cent. of the apple crop was made into unfermented juice.

Definitions Necessary

The views of the committee were that a grade of apple juice should be defined and suitably named to include only fresh, undiluted apple juice which has undergone the minimum treatment necessary for clarification and stabilisation, and to be free from colouring matter and preservatives. It may also be desirable to define a sweetened juice and also a concentrate.

In view of the fact that these beverages are easily faked, it is felt that the consumer has the right to know exactly what he is buying.

Mr. Norbury thought that we were fortunate in a way in being one of the last countries to adopt standards for beverages, because we could draw upon the experience of other countries which have been using standards for

some time. He proceeded to quote in full the regulations in force in Canada. These controlled such items as alcoholic content, specific gravity, sugar content and ash.

Finally, the fruit growers and fruit juice and syrup industry are preparing standards for apple juice which, with the support of the Ministry of Agriculture, will be submitted to the Minister of Health with a request for an order. That is the short-term policy. The long-term policy is to have standards laid down for all beverages.

It was really for the consumers to demand standards rather than producers, but unfortunately there were no consumers' organisations in this country who could speak with one voice. He asked for the support and sympathy of the distributive trade and the medical profession.

At the conclusion of Mr. Norbury's address the conference adjourned for lunch, which was laid out in the Cider House. A large selection of fruit juices, both Continental and British, were available for examination and tasting, and also British fruit concentrates and syrups.

A spectacular demonstration of the preparation of fruit juice by the "cold process" consisted of a perfectly closed room, in which the operations were viewed through glass windows. A description of this is contained in Mr. Charley's address.

Another exhibit was the preparation of juice by the flash pasteurisation method in a model plant built on a semi-industrial scale.

World Developments

The work of the conference was continued in the afternoon by an address by Mr. Roger C. Morel, Secretary of the Apple Juice Producers' Association. Mr. Morel said that his remarks would be confined to the consideration of indigenous raw material for fruit juices, limited therefore to the apple, and soft fruits such as the strawberry, raspberry, loganberry and black currant.

Mr. Morel ascribed the popularity of unfermented fruit juices in Germany and Switzerland to their preparation in the first place in the home kitchen. Even to-day, when large supplies of commercially prepared apple juice are available in Germany, up-to-date equipment for its preparation in the home can be purchased.

In Switzerland, approximately five million gallons of apple juice are made annually, which amounts to a consumption of about 2 litres per head of the population. Germany's production grew from two million gallons in 1929 to fifteen million gallons in 1937—about 1 litre per head—and is now only limited by the supplies of apples available. In no other European country have there been developments comparable with the preceding, although in countries where apples are being grown there are factories in the pioneering stage. Considerable progress has been made in the United States, the production of apple juice by modern technique having reached seven million gallons.

In Canada, Australia and New Zealand the production of apple juice on similar lines to those described has already been started, the need for a satisfactory outlet for surplus apples being perhaps the primary consideration.

The apple juice industry in England is as yet in the early stages of development, only two years having elapsed since the installation of the first commercial plant in Devonshire in 1936.

Soft Fruit Syrups

Mr. Morel mentioned an important development of another form of fruit product—the syrups prepared from the juices of soft fruits. Long Ashton had examined these possibilities from 1934 onwards, and by 1936 had perfected a cold process for their preparation. These products are pure fruit syrups and are sold in two forms —for mixing with milk or water for fruit drinks and for general purposes, including the flavouring of ice-cream. As had been previously mentioned by Professor Barker,

"... The bottling room is treated as a sanctuary, and the sterilisation of the plant, bottles, closures, clothes of working personnel and the air in the room itself is given every attention."

a Bristol firm has earned the distinction of equipping the first factory of its kind in the world for large-scale production by the Long Ashton process.

Mr. Charley's Address

"Pure Fruit Juices and Syrups: Their Methods of Manufacture, Chemical Composition and Significance from Medical and Nutritional Points of View" was the title of the address given by Mr. Vernon L. S. Charley, B.Sc., who is in charge of the Fruit Products Section of the Long Ashton Station. The address was of paramount importance for those in any way interested in the new industry, bringing up to date, as it did, the whole subject from the technical and scientific angles.

The main trend in fruit juice production is concerned with the development of two products—*i.e.*, apple juice and fruit syrups—in which an attempt is being made to reduce the various processing manipulations to the absolute minimum and to place the greatest possible emphasis on the importance of purity and nutritional value of the product.

Necessary Characteristics

To achieve a ready sale it is necessary for juices to possess characteristics, amongst the most important of which are:

1. Attractive fruit flavour.
2. Correct balance of sweetness and acidity.
3. Attractive colour and brilliant appearance.
4. Nutritive value.

Mr. Charley proceeded with the consideration of the different compounds to which are due the specific flavours of fruits and the methods best adapted to the prevention of their decomposition. The chemical changes are difficult to control, but oxidase action is liable to produce them. This biochemical action is minimised by the de-aeration of the juice and the inactivation of the oxidase systems by pasteurisation.

As regards sugar-acid ration, tastes differed very much. The average malic acid acidity acceptable in this country is in the neighbourhood of 0·5 per cent., in France it is 0·3 per cent., while in Germany it rises to 1·0 per cent., an acidity which would be quite unpalatable to the English public.

The adjustment of standard acidity might be effected by the blending of the juice from apples of differing acidities. It could also be done by the addition of acid or sugar, or in the case of too acid juice by the removal of the acid; but while there is no real objection to be raised to the chemical adjustment of the sugar and acid contents of fruit juices, blending should always be attempted in the first place.

The problem of obtaining perfect clarity and satisfactory colour in fruit juices has been solved by the use of commercial enzymes which stabilise the pectic compounds responsible for the formation of cloudiness. These enzymes also so reduce the viscosity of the juices as to enable them to pass readily through a suitable type of filter.

The nutritive constituents of apple juice may be considered to be the fruit sugars. In the case of syrups, the retention of the very high content of vitamin C is of the greatest importance, and optimum conditions for retention are yet to be discovered.

Production of Juice

Mr. Charley then described the actual production of apple juice by different methods.

The apples are washed (where necessary) and ground into a fine pulp by grater and hammer mills. The juice is expressed from the pulp by hydraulic pressure, the yield in general being from 150 to 170 gallons per ton. In some cases the juice is macerated for 12 hours with a portion of the residue remaining in the press cloths, to impart a certain fullness to the juice that is not a feature of the freshly expressed juice. The juice is next treated with an enzyme, which is allowed to act at room temperature, or slightly above, for 12 to 48 hours. A remarkable clarification occurs, for the pectin removal and consequent decrease in viscosity of the juice permits a more or less complete deposition of finely divided tissues and precipitated materials.

Treatment of Clarified Juice

The clarified juice can now be treated in a variety of ways, amongst which are the following:

Hot (i) Filtration and pasteurisation into bottle or in bottle.
,, (ii) Pasteurisation and storage in glass jars or metal tank.
Cold (iii) Sterilising filtration and storage in sterile wooden casks or bottles.
,, (iv) Centrifugation and storage in 5,000-gal. steel tanks under pressure of 120 lb. CO_2/sq. in.

Undoubtedly the last method is the most popular at the present time. The scientific principle, the discovery of Professor Boehi of Switzerland, involves the impregnation of 8 atmospheres pressure of CO_2 into the enzymed juice. This physical method of storage is a sure safeguard against fermentation or microbiological activity.

Cold Process

The cold process, which is in widespread use in Germany in commercial factories, consists of the use of these bulk storage tanks in combination with the Seitz method of sterile bottling. The filter discs are capable of retaining yeasts and bacteria, and the secret of success in this process is to prevent the access to the sterile juice of organisms which would cause fermentation later in the history of the juice. Most elaborate precautions are taken to ensure 100 per cent. sterility in the bottled products. The bottling room is treated as a sanctuary, and the sterilisation of the plant, bottles, closures, clothes of working personnel and the air in the room itself is given every attention. The pressure of air in the bottling room is maintained at 1 atmosphere above that of the outside air, to ensure a continual outward flow of air and prevent any access of yeast-infected air into the room.

Hot Process

The hot process involves the flash pasteurisation of the juices into steel tanks lined with a resistant covering or into 5- to 10-gallon glass jars, which are subsequently fitted with patent rubber caps. After storage, the juices are re-filtered and pasteurised into bottles or cans for sale. The pasteurisation process affects the flavour to some slight extent, but with modern improvements it is possible to avoid any unpleasant cooked taste in the juices and, in many cases, stable juices have been prepared in which the flavour was practically as fresh and true to the fresh fruit taste as those produced by the cold process. Those juices which are made completely in the cold are characterised by very fresh, clean and attractive flavours, reminiscent of the fresh, raw juice, and in many cases superior in quality to it. It is not clear, however, whether the general public will appreciate the fine points of difference in flavours. In some juices, such as Bramley's Seedling, it is probable that the more attractive juices will be made by the use of a carefully controlled flash pasteurisation method, but with juices which are sufficiently flavoured, the cold process is unique in retaining that fresh flavour that is so attractive.

Final Filling

The final filling may be into bottles or cans. There are a number of advantages associated with the use of cans, and in the last two years special tasteless wax linings have been developed which have proved to be perfectly satisfactory over a very long period of contact with apple juices. The can is a most hygienic container for fruit juices, and although a certain amount of prejudice still exists there are signs that the advantages offered by this package are being more and more appreciated.

In Germany, and in very recent months in this country too, dispensing machines have been introduced for the convenience of hospitals, clinics, nursing homes, etc. The juices can be drawn off at any time, and a filter in the neck of the 5- to 10-gallon vessel sterilises the air which is drawn in.

Fruit Syrup Production

The methods in this case differ fundamentally from those used for apple juice. In the case of English soft fruits it is often impossible to obtain an economic yield of juice by direct expression of the juice from the milled fruit on account of its extremely viscous nature. Consequently, the fruit is mashed and the commercial enzyme (0·2 per cent.) is allowed to act on the pulped fruit itself. Temperatures are apt to be high during June and July, when most of the processing is carried out, and spontaneous fermentation is an ever-present danger. Strawberries and raspberries are generally de-pectinised in 16 to 24 hours, while black currants take from 3 to 5 days. The effect of the enzyme is remarkable. A progressive thinning of the juice results in a solid, hard layer of tissue forming on the top of the vats, while the clear juice collects at the bottom. The juice is run off, the tissue is pressed and the blend of the two bulks of juice is centrifuged, syruped with pure solid cane sugar until the syrup registers 55 per cent. sugar by weight. The solution of sugar is carried out, as are all the other processes in the cold. It has been found that with pure fruit syrups of this type it is necessary to adjust the acidity to 1·0 per cent. citric acid by weight if it is desired to preserve the syrup by 350 parts per million of SO_2. Consequently this adjustment is made (it is only necessary, in general, in the case of the strawberry), and the syrup is preserved with SO_2, filtered and stored in bulk. The syrups are practically free from any pectic substances that are determined by the calcium pectate method, and this feature may be of some significance from the point of view of the health aspect of black currant syrup.

Concentrates

Concentrates possess many advantages over syrups from the storage point of view. In recent years great improvements have been made in the hot method of evaporation *in vacuo*, and it is now possible to fractionate the distillate and collect the volatile fractions with a view to their return later to the concentrate. But, despite these improvements, the fresh fruit character is impaired to some extent, especially in the case of the strawberry. Experiments made with an English evaporator in a Bristol factory by the speaker had shown the possibility of producing very attractive concentrates from raspberry juice, but strawberry was not so satisfactory.

The freezing method of Krause has recently been developed into a continuous process, and represents what is probably the best method of concentration from the point of view of ultimate flavour.

Milk Shakes

The extreme importance of recognising the valuable nutritional elements contained in a milk shake made from pure milk and pure fruit syrups is emphasised. The high vitamin C content and the easily assimilable sugars of black currant syrup and the high food values of the milk combine to produce a beverage of nutritional importance. It was suggested that the decline in the "milk in schools scheme" may be arrested by serving milk shakes made with a range of products, by varying the flavours day by day and thus avoiding the monotony of the same flavour of milk, which apparently was the cause of the dislike of the drinks. Experiments in certain schools were suggested as being a useful way of determining whether any such scheme would be generally feasible.

Canned Black Currant Syrup

In view of the high vitamin C content of black currant syrup, it is considered to be necessary to investigate the possibility of such a product being of national importance in times of war or other emergency. The possibility of restriction or cessation of supplies of citrus fruits or fresh juices from abroad must be examined, and in the eventuality of such a position arising supplies of

(*Continued on page* 166)

MARMALADE MAKING

". . . marmalade is tasty, if
It's
Very
Thickly
Spread."

Acknowledgments to Mr. A. A. Milne.

NO PRODUCT of mushroom growth is the British food industry. To the many fine old firms still retaining all the evidences of youthful energy, ever bringing their methods in line with plant and process research, whose operations have been described in these columns, is now added T. G. Tickler, Ltd.

Started in Grimsby by Mr. T. G. Tickler just sixty-one years ago, it is still flourishing in the Northern factory, with all its modern improvements in plant and extensive additions to the buildings.

In 1911 the Southall factory came into existence. The founder of the firm, Mr. T. G. Tickler (who was M.P. for Grimsby), died last year at the age of eighty-five.

Mr. Tickler brought no less than six of his sons into the business—surely a confession of faith, not only in the business, but in his sons!—and these are all carrying on, Mr. George Tickler, the eldest son, following his father as Chairman and Managing Director.

The range of products manufactured at Southall is a wide one, embracing as it does all kinds of jams, different types of marmalade, as well as other products, including candied peels, table jellies, pickles, sauces, and summer drinks.

It was at the peak of the marmalade-making season that the factory was visited. Working at high pressure, literally scores of thousands of oranges were disappearing into jars each day.

Sorting the Fruit

Stacked high around the sorting table are thousands of cases of Seville oranges, which, as they are needed, are brought to floor level, their tops ripped off, and their contents, still enveloped in their individual tissue paper wrapping, tipped on to the table for sorting and inspection, the first item of the long and somewhat intricate series of operations which the fruit undergoes in its journey to the jar.

Pounced upon by a small army of women, the oranges are divested of paper wrappings and, travelling along a moving band, imperfect fruit rejected and the stalks of the good ones removed.

Washing Operations

At the end of the band is a sloping board, down which the oranges fall into a hot-water washing tank.

The washing of fruit is a revelation to the uninitiated. The problem of the satisfactory washing of soft fruits such as strawberries has been overcome in an ingenious way. The freshly picked fruit is slowly conveyed along a wide belt, which is also a fine sieve, and during their journey are sprayed by overhead sprinklers, which gently but surely remove all grit.

Returning to the oranges, despite the fact that the fruit has already passed the scrutiny of many pairs of eyes, it is finally inspected as it emerges from the bath, and it is very evident that only fruit in perfect condition is permitted to go forward.

Weighing and Quartering

For the purposes of control, the oranges are next put into boxes and weighed, passing from the scales to the quartering machines. The work done by these machines is very fascinating to watch. The whole fruit enters the machine and emerges from two different exits. From one comes the peel of the orange cut into four quarters and from the other comes the whole of the pulp. The peel is taken to a wire shaking machine, where any adherent pips are removed.

BY MODERN METHODS

Marmalade and other fruit products have been made by T. G. TICKLER, LTD., for sixty-one years. Mr. T. G. Tickler founded the business at Grimsby in 1879, and his six sons are carrying on the old traditions. Operations at their Southall factory at the height of the Seville orange season are described by *T. Crosbie Walsh*, F.I.C.

Chipping Machines

From the shaking machine the peel is passed through a chipping machine, which "chips" it into the size and shape seen in the finished product.

This work is done by two distinct types of machine. Of relatively low capacity, there is a battery of an older type which produces a chip of characteristic shape and thickness. Another more modern type of machine chips the peel in a twentieth part of the time occupied by the first-named machine. Although the chips produced by the more rapid machine are well adapted to the production of certain kinds of marmalade, the slower ones are still used for other kinds. Apparently a faster type of machine has not yet been devised which will produce a chip identical with that produced by the slower machine.

Pulp and Peel Treatment

At this stage the oranges have been divided into two parts: the peel, freed from pips and chipped, and the pulp as it emerged from the quartering machine.

These materials are now pumped separately to an upper floor, on which is installed a battery of autoclaves.

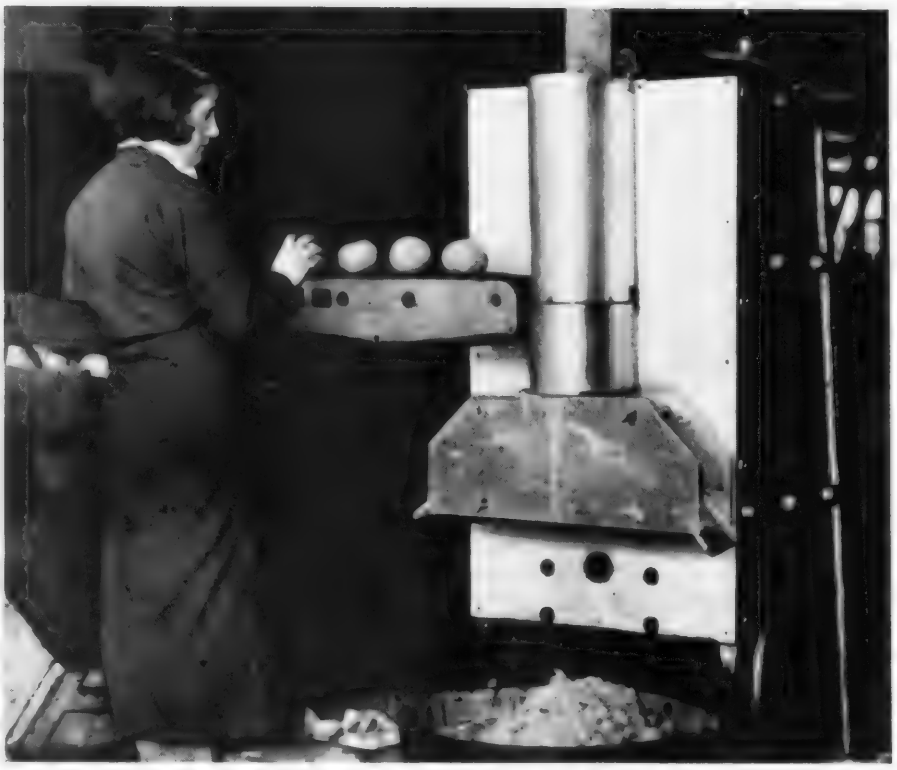
Still kept separate, the peel and the pulp are cooked, and the cooked material run down into tanks on the floor from which they originally came.

The cooked pulp still contains its pips, and these are now removed by a rotary brush separator, after which the cooked peel is added to it and the whole mixed in a tank *ad hoc*. At this stage of the process a certain proportion of whole untreated oranges is added.

Boiling Pans

In the boiling house, impressively set in a long row, are several batteries of boiling pans, in which the re-

". . . the peel is passed through a chipping machine, which 'chips' it into the size and shape seen in the finished product."



Quartering the oranges.

". . . the work done by these machines is very fascinating to watch. The whole fruit enters the machine and emerges from two different exits."

". . . in the boiling house, impressively set in a long row, are several batteries of boiling pans, in which the requisite amount of sugar is added to the prepared fruit."

Picture on page 156 shows a pan being discharged.

quisite amount of sugar is added to the prepared fruit. Each pan is charged with its *quotum* of fruit, the sugar solution added and the final cooking effected.

The sugar solution is prepared on an upstairs department fitted with dissolving tanks and filter presses, and falls by gravity into automatic weighing machines situated in a corner of the boiling house. As each lot is weighed it is passed into a closed vessel, from which it is forced into the pans by means of compressed air.

Filling into Jars

After boiling for the prescribed period, the marmalade is ready—or nearly ready—for filling into jars. It is not quite ready, as it is too hot to put immediately into glass receptacles, and has to undergo a cooling process in open water-cooled copper pans, which soon bring the temperature of the marmalade to the required degree.

In the case of jelly marmalade, the product is sucked from the cooling pans by vacuum machine directly to the nozzles of the jar-filling machines. A constant stream of jars are automatically passed under the nozzles, which deliver the exact weight required.

Jar Cleaning and Heating

Prior to arriving at the filling point, the glass jars are washed and dried. They are then placed in a long tunnel, through which runs a moving belt. This tunnel is heated by closed steam-pipes, and by the time the glass jars have traversed its length they are warm enough to obviate any risk of breakage through sudden contact with the hot marmalade, even though this has been partially cooled.

The general impression of the filling operations is one of leisurely activity, yet *each* of the many filling machines installed has a capacity of 100 gross of jars per day, or one every two seconds!

Two girls remove and stack the production of one filling machine, and in their stride place a little circle of paper on the surface of the marmalade.

"Nell Gwyn" and Jelly Marmalade

Two main types of product made by T. G. Tickler, Ltd., are "Nell Gwyn" and Jelly Marmalade. "Nell Gwyn" Marmalade is decidedly a *de luxe* article. It rejoices in an elegant outer dress which, however, does not belie the excellence of its contents, as a critical tasting demonstrated to the writer.

The process described above represents, with some modifications, which are the treasured secret of the firm, the general lines of the manufacture of "Nell Gwyn" Marmalade.

Owing, however, to its particular consistency and other qualities, the filling of the jars is done by hand. The filled jars are passed by the operators to a circular table with a moving top, where white enamelled metal caps are fitted to them.

From the table the jars are placed on the special capping machine, which seals the closure hermetically. Automatically, from the capping machine the jars are

Top: **Charging an autoclave.**

Below: **Filling jars with "Nell Gwyn" marmalade.**

Top left : **Filling machine for Jelly Marmalade.**

Top right : **Labelling jars.**

Bottom left : **The jam store.**

conveyed through an open steam steriliser, emerging at the far end not only sterile as to contents but clean and dry outside.

It is now only a short step to the nicely labelled, Cellophane-covered final product in its semi-triangular jar.

The Jelly Marmalade is covered with parchment paper in the good old-fashioned style.

Labelling and Storing

In the large department which comprises the labelling and storing room is a long table upon which is received jars coming from the filling machine, along the centre of which runs a narrow moving band. At points along this table are installed labelling machines.

One of the most impressive sights in this extensive factory is a large room covering over two acres in which stacks of jam, made up during the fresh fruit season, are to be seen, rising from the ground to within a few feet of the roof of the building. Quite thin, oblong pieces of wood are placed between each layer of jars, and it is amazing how the bottom jars in the stack can bear the great weight of the thousands of jars stacked upon them.

One impression created on seeing these long lines of stacks of preserves is that of a giant liner in its strength and simplicity, and another is the enormous amount of jam consumed by the British public.

Fresh Fruit Squashes

With the approach of the summer season, it is interesting to see enormous quantities of oranges, lemons, grapefruit and limes having their juices squeezed from them for the preparation of fresh fruit squashes.

The acidity of the fruits is carefully tested by analytical chemists, and the whole of the work of expressing the juices from the fruits, sweetening, bottling, and finishing is carried out under the strictest supervision and under conditions which will bear inspection from the most critical observer.

SOME SUPPLIERS TO THE FACTORIES OF T. G. TICKLER, LTD.

Rotary Brush for Pulp: *Aluminium Plant and Vessel Co., Ltd.*
Pans: *Hopkinsons, Ltd.*
Caps for "Nell Gwyn" Bottles: *Metal Closures, Ltd.*
Cans: *Metal Box Co., Ltd.*
Motors: *Crompton Parkinson, Ltd.*
Labelling Machines: *Purdy Patent Machinery Co., Ltd.*
Pumps: *Broom and Wade, Ltd.*
Mixers: *Baker Perkins, Ltd.; Robert Kellie and Son, Ltd.*
Labels: *G. Duncan and Co., Ltd.; Field and Co., Ltd.*
Washing Machines: *Bratby and Hinchliffe, Ltd.; G. Hopkins and Sons, Ltd.*
Economisers: *Broom and Wade, Ltd.*
Double Seamers: *Metal Box Co., Ltd.*

THE WASHING OF GLASS CONTAINERS

To put perfect foods into faultily cleansed containers would be labour lost. H. A. H. CROWTHER, *F.C.S.*, describes the methods by which sterility and clarity of glass containers may be ensured and the tests applied for control of the washing.

FROM EVERY point of view the glass container remains the ideal package for food products. In the first place, it possesses the incomparable asset of transparency—a point which is so obvious as to require restatement lest its possibilities of presentation be overlooked. All too frequently cases are seen where the attractive appearance of a brilliant product in a good white flint glass is hidden under a needlessly large and ugly label.

Secondly, the impervious nature of the glass renders it an ideal product for the manufacture of food containers and, given careful consideration, the cleansing and sterilising of the vessels can be accomplished with certainty and consistency.

In considering this matter two factors will present themselves for special consideration, and the decision as to the compound to be employed in the washing of them is largely dependent on these points.

Returned Vessels

The first is the "soil" present in the returned vessels, since it is obvious that the detergent compound to be used must be most carefully adjusted in consideration of this. It will, for instance, require a different compound for the cleansing of beer bottles with their acid residues, as compared with that which will be successfully employed for the removal of milk residues in returned milk bottles.

The second factor is that of the nature of the water supply, since unless special care is taken with this the successful washing of the bottles—so far as the removal of the soil is concerned—can be negatived by the production of film or bloom on the final washed bottle.

In the cleansing of glass containers various factors play their part, and whilst these factors are more or less coincidental in practice it is well in considering the matter to regard them as separate factors, having regard, however, to their relation one to the other.

Wetting Power

The first objective of the cleansing solution must obviously be to wet the container, and in order successfully to do this it must penetrate the soil. This introduces the first factor which the detergent compound must possess, the factor to which is given the name "wetting power." It is only insofar as the solution can penetrate the soil and produce a thin film of liquid between the vessel and the soil that the deposit can be successfully removed.

In formulating the detergent compound it must be remembered that wetting power has no direct relation to alkalinity, and that many workers hold the view that alkalies in themselves possess little, if any, wetting power.

Next, the solution must reduce the interfacial tension as between the deposit concerned and the water, and in this way materially assist in breaking up the soil into tiny particles and so prepare it for the subsequent emulsification of those particles into the solution. This ability of the solution to emulsify the deposit is an important function of the detergent compound, and to-day considerable importance is attached to this since it is believed that it plays an important part in the subsequent cleaning efficiency of the solution, since these electrically charged bodies of almost colloid size must play an important part in the cleaning process by introducing a scrubbing action.

Emulsification and Saponification

There is at times a tendency to confuse emulsification with saponification, and, based on this misunderstanding, it has been contended that a good detergent solution must have a very high caustic content. This is probably contrary to the facts, for certain tests have been made using quantities of paraffin oil and soap solution and it is interesting to compare the results obtained.

A solution containing 0·8 per cent. of soap (sodium oleate) was agitated in a graduated cylinder and gave a cream reading, that is to say, the emulsified oil at the top of the solution, of 16 c.c. When 0·2 per cent. of sodium hydroxide was added the reading fell to 5 c.c., while at 0·5 per cent. alkali a reading of nil was obtained.

The addition, therefore, of caustic soda materially reduces the ability of this soap solution to emulsify. Against this it was found that the milder alkalies, as, for instance, borax, greatly increased the emulsification and that the addition of 0·2 per cent. of borax increased the

cream layer to 39 c.c., whilst a 1 per cent. addition of borax raised the figure to 51 c.c.

It will be appreciated, of course, that the use of borax in detergents for the dairy industry would be prohibited by the restrictions of the Milk and Dairies Order, 1926, but there are many other mild alkalies, as, for instance, the various phosphates of sodium, which are of great value in this connection.

Deflocculation

The next point is that of the deflocculation of the soil. This has been variously termed also "peptisation" and "disintegration", and is, of course, that ability of the detergent compound to break down the soil into small, easily suspended particles.

The writer has suggested in an earlier paper that the explanation of this mechanism of deflocculation arises out of the fact that much of the soil will consist of resinous and other substances of approximately colloidal particle size, and that these assume electrical charges by adsorption of the OH and CO_3 ions in the cleaning solution from the alkaline substances present in the detergent.

Now it follows that these colloidal particles, taking on similar electrical charges, must create repulsion, so that they become more or less evenly spaced from each other within the limits of the solution. When this state commences, disintegration of the mass of soil follows rapidly, and it is obvious that the greatest efficiency will exist when the detergent compound is of a colloidal nature and introduces colloidal particles into the solution.

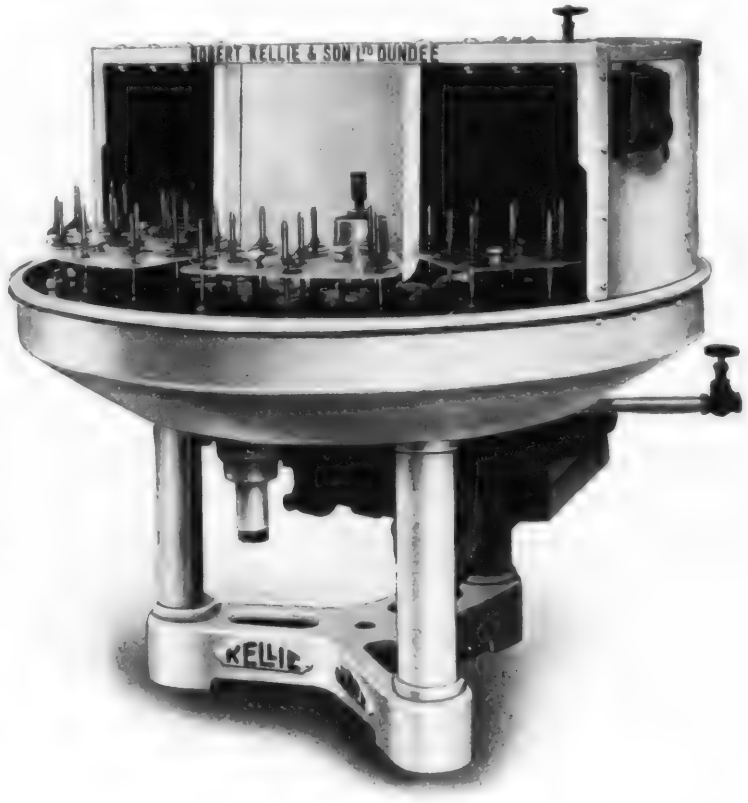
At this stage, then, the bottle may be regarded as being in a solution in which is contained a great deal of soil removed from the bottles together with the alkali present in the original detergent compound, and the final appearance of the bottle will, therefore, largely depend on the rinsibility of the detergent compound employed. This rinsibility is a factor of very great importance from two points of view.

Sterility of Bottles

In the first place, the extent to which the detergent compound and the soil is rinsed from the bottle will largely determine the brilliance of the finished washed bottle, and, secondly, this has a very great bearing on the final sterility of the bottle.

It has been shown that under the normal bottle-washing arrangements employed, the period of contact is not as a rule long enough to ensure the complete destruction of any spores which may be present, although long enough to give an adequate margin of safety for dealing with *B. coli* and *B. typhosus* and such organisms.

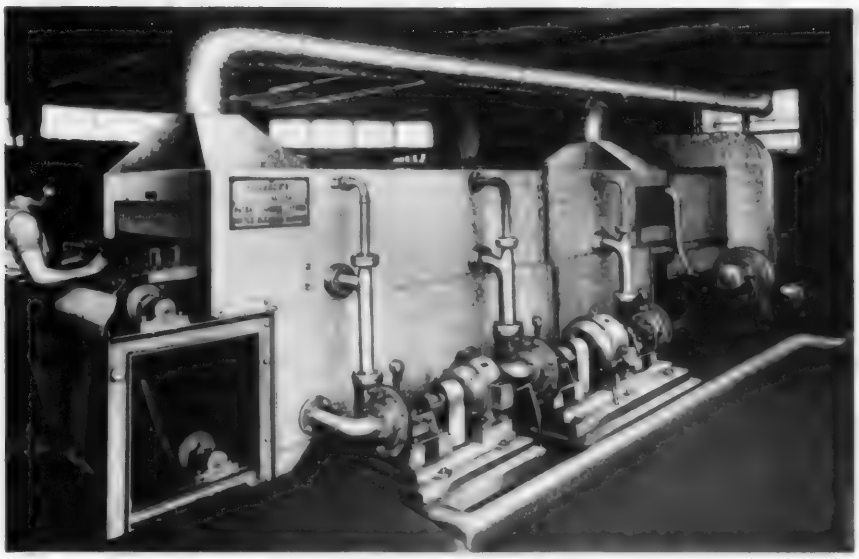
In order, therefore, to ensure that the period of contact is adequate, the most satisfactory method is so to design the detergent compound as to provide adequate rinsibility and in this way ensure the skidding from the bottle of all bacteria into the detergent solution, where, in the inevitably longer period of contact, complete destruction



The containers are inverted over the vertical spray tubes, positioned on the adjustable elevating platforms and carried under the galvanised steel hood, where they are thoroughly washed and sterilised both inside and outside.

"Kellie" rotary automatic washing and sterilising machine.

(Robert Kellie and Son, Ltd.)



A jar- and small bottle-washing machine including drying chambers, installed at a Knottingley glass works.

(Dawson Bros., Ltd.)

will be ensured. Finally, we come to the question of the bacteriological sterilisation of the bottle.

There are in any bottle-washing process three factors which will have a material bearing on this. These are, firstly, the concentration of the detergent solution employed; secondly, the temperature of this solution; and, thirdly, the period of contact. These three factors are parallel for any one detergent compound, but it must be appreciated that much can be done in the formulation of the detergent compound greatly to increase the sterilising value of the process as a whole. The ratio of time : temperature : concentration is not as a rule generally appreciated, and yet experiments show that within the ranges of temperature from, say, 100° to 140° F., the period of contact must be doubled for every ten degrees fall in temperature. Again, if the temperature is maintained at a constant figure, the period of contact must be increased 3·5 times when the concentration is halved.

We have so far concerned ourselves with what may be called the mechanical functions of the detergent solution, and we must now consider other adjustments which are necessary in accordance with given circumstances in the bottle-washing process.

Composition of Washing Water

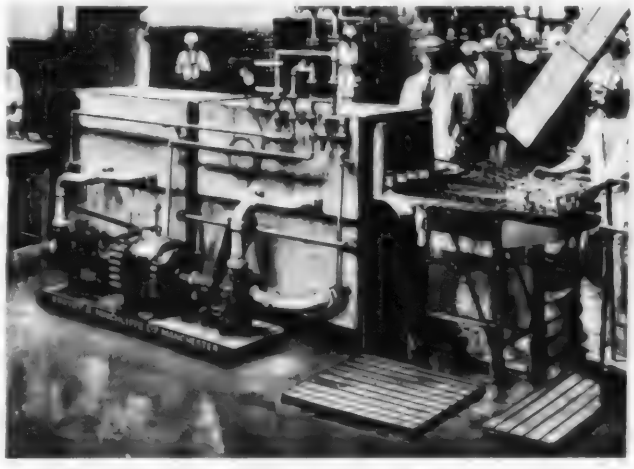
The first of these is obviously the nature of the water supply, and it is imperative before proceeding to prepare the detergent compound that a complete analysis of the water supply be obtained and the detergent compound adjusted accordingly. This is the usual practice of most of the large detergent manufacturers to-day, and, as a general rule, it may be said that it is very sound policy for the plant manager to take advantage of the service which is offered by organisations specialising in these compounds rather than to attempt to formulate one himself for his own requirements. Unless special care is taken to adjust the compound in accordance with the evidence of the water analysis, there will be a tendency for bloom and film to form on the bottles and the pumps and jets of the machine to become badly scaled.

Various methods are employed to overcome these in the detergent compound. Probably the most effective of these is the formulation of a colloidal detergent to ensure precipitation of the chalk in a suspended form, and so prevent this adhering to the metal of the machine or glass of the bottle.

In exceptional cases, sodium hexametaphosphate will also be employed, and in certain cases the aluminium salts.

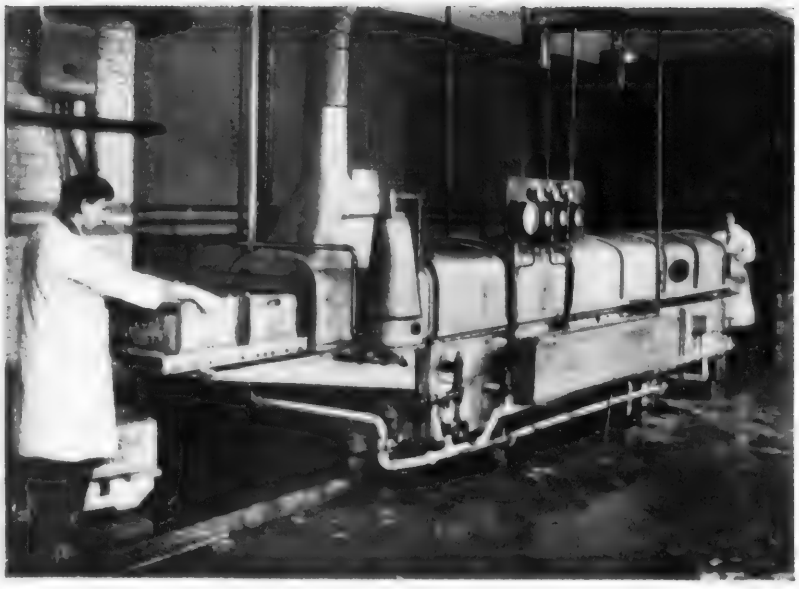
Adjustment to the detergent compound will also, of course, be necessary according to the machine employed. For instance, the compound used in a machine which depends for its cleaning efficiency on the employment of powerful pumps throwing jets of solution on to the bottles will be quite different from that used in a soaker type of machine.

Apart from the fact that the cleaning efficiency is reduced unless this adjustment is made, considerable



Machine-cleaning jam jars at Messrs. W. P. Hartley and Sons, Ltd., Aintree.

(Bratby and Hinchliffe, Ltd.)



Washing machine which can be adapted to any type of bottle, jar or pot.

(A. Grabham and Co., Ltd.)

mechanical difficulties will arise from the fact that a wrongly adjusted solution will produce considerable "fobbing" of the solution, with resultant waste of detergent and loss of efficiency.

Contents of Bottles

Next we come to consideration of the contents of the bottle, and, as has been suggested earlier, the compound used for the washing of milk bottles will differ materially from that employed for, say, beer bottles.

In the milk bottles, emulsification is of the highest importance, and it has been found that much more satisfactory results can be obtained by the emulsification of the milk residues rather than by an attempt to convert them into a soap by the employment of caustic soda solutions, which are, of course, notoriously difficult to rinse.

In the case of beer bottles, the primary factor there is to ensure that no alkali remains in the bottle since traces of alkali left behind will have a considerable effect on the beer in increasing the *p*H. In the case of beer, the range of *p*H is exceedingly narrow, being between 3·8 and 4, and it requires, therefore, very slight traces of alkali to have a marked effect on the palate and bouquet of the bottled beer.

In beer bottles, as, of course, also in milk bottles, effective sterilisation is of great importance, and steps will therefore be taken in formulating the detergent to increase the sterilising efficiency of the compound by the employment of various amplifying agents, as, for instance, stretonite.

Mechanical Aspects

Mechanical washing of the bottles, as distinct from the chemical aspect of this question, can be effected by one or more of three methods.

The bottle may be washed by soaking, by spraying with solution under high pressure, or by brushing, or, as is frequently the case, by the combination of one or more of these factors. The question as to which method is best suited for each individual case will depend entirely on the circumstances of that case, since it has been clearly demonstrated that, given adequate period of contact, reasonable temperature, and the appropriate concentration, thoroughly satisfactory results can be obtained by any method.

It will be appreciated that there are cases, as, for instance, in conditioned-in-bottle beer, where either prolonged contact with the soaking solution or high temperature of the jetting solution is essential, and it is such factors as these which must be considered in deciding on the mechanical equipment to be employed for the washing of the bottles.

Chemical Tests

In conclusion, three tests are here given which the plant manager can very easily carry out under his own control and which will materially help in maintaining the standard required.

The first of these is, of course, the testing of the detergent concentration, and most of the large detergent manufacturers to-day supply without charge testing sets, by means of which the detergent concentration can be easily checked and refreshers added as necessary.

The second test requires the employment of a 1 per cent. concentration of phenolphthalein in 25 per cent. alcohol. A few drops of this is introduced into the washed bottle as it is delivered by the machine, and no bluish coloration should be produced in a properly rinsed and washed bottle. Any bluish coloration indicates that either the detergent solution is not free rinsing or that certain of the rinse jets are not functioning.

The third is of particular interest where greasy or fatty compounds are bottled. In such cases it is desirous to check that no film is allowed to remain on the bottles after the cleaning process. This can very easily happen unless the detergent is adjusted accordingly, and the

presence of film is most undesirable, since it can be shown that such film will harbour bacteria, although these may not show up on the usual rinsings taken when bacteriological examinations are made. It can be shown, however, that if film is present on the bottles, organisms are present in this film and will affect the subsequent contents of the bottle.

The bottles should therefore be tested for film by the employment of Czapliwski Stain. The stain is made according to the following formula. The bottle is rinsed with about 20 c.c. of the solution, which is allowed to remain in the bottle for about five minutes. It is then rinsed out with fresh water, and film will be indicated by the presence of pink stain on the side of the bottle.

The stain is made up as follows: 2 gm. of basic fuchsin are dissolved in 10 c.c. of carbolic acid, warming to assist solution; 100 c.c. of glycerine are added to the mixture with stirring; after which 200 c.c. of distilled water are added.

Conclusion

The washing of glass containers is, therefore, a matter requiring a good deal of technical consideration, but, given the appropriate knowledge in the preparation of the detergent, engineering skill in the design of the machine, and reasonable plant control on the lines suggested above, a consistently high and satisfactory standard of efficiency may well be expected.

KENT APPLE GROWERS MAKE CO-OPERATION THEIR AIM

EMPIRE AND foreign fruit-packing stations have set up such a high standard of grading and packing that unless the British producer conforms to it he will find it difficult to survive the severe competition which is its natural corollary.

That this state of affairs is realised by the home growers is evidenced by the establishment of a number of packing stations in this country, run on the basis of co-operation between growers, salesmen and manufacturers of packing material. Claiming to be the first in this field is the Apple Growers' Association (West Kent), Ltd., at Marden.

Making Fruit Farming Pay

Real co-operation is the keynote of the Association's ideals and practice—that co-operation which ensures, among other things, efficient distribution of the produce handled and low costs of production.

At Marden, the packing station forms a kind of centre. Shooting out from it on one side is an overhead electric escalator leading to a box factory, on another side is a cider factory and on still another a haulage contractor's depôt—all of whose activities are closely bound up with those of the packing station—all placed in the very heart of the Kentish fruit lands.

Under its brand "A.G.A.", the station handles 250,000 bushels of apples during the season running from July to April, being fed by the members' farms, spread over the Weald of Kent. Each of these farms has a refrigeration store with an average capacity of 2,500 trays containing three-quarters of a bushel of apples.

The Packing Station

When the fruit arrives from the farms it enters the reception room, which has a capacity for several thousand bushels of fruit. The fruit is handled under a system which ensures correct rotation of the various consignments. By means of a code number it may be followed through the subsequent operations with accuracy.

Grading

The next step is grading. The fruit is loaded on conveyors and passes to one of the hatchways connecting grading and reception rooms. Tipped by hand into a canvas hopper, it proceeds to the feed table which connects with the grader. This feed table consists of a returning canvas belt, geared to various speeds on each side of the machine. Woman graders place the apples on the cups of the grader. There are two grading machines, one for dessert and the other for culinary apples.

From the grading room, where packing is also carried out, the fruit passes to the despatch room. As each package goes through the hatchway its grade and count are recorded, details of which go to the office, from whence a copy is sent to the grower.

The nearby haulage facilities ensure prompt and constant conveyance to selected markets.

Pooling Prices

By a system of pooling prices the growers are enabled to avail themselves of every advantage of market demand and daily fluctuations in prices. Under this system, every variety of apple has its pool, which is subdivided into its respective grades, each grade having a section for the various range of counts packed. In this way, the grower is paid according to the quality of his fruit.

In order that a grower, who by special cultural means

has obtained large fruits for the early markets, may be suitably recompensed, a pool may run for periods varying from one to two weeks or more and then be closed. At the end of the time for which a pool is run, there is an average pool price per bushel for every section of every grade, and a grower is paid out according to the number of bushels which he has had in the various sections of each grade. It is obvious that full payments can only be made to growers after a pool has been closed, and therefore a provisional advance is made according to his grading analysis. To safeguard the interests of the grower, all monies received from the sale of fruit are paid into a separate trustee account.

Farm Refrigerators

As has been stated, each of the nineteen members of the Association has a refrigeration store on his farm. Fruit brought in from the orchard is placed in oiled wrappers and then on to wooden refrigeration trays. These trays are first soaked in water in order to avoid absorption by the wood of the moisture in the fruit.

Once properly stored, the operation of the store is relatively simple, the chief problem being that of ensuring the proper composition of the gases. Special attention must be given in the early stages, but once the fruit has settled down its respiration rate becomes more or less constant.

The stores are fitted with modern appliances for air circulation, the temperature being maintained at around 39° F. and the carbon dioxide content averages 8 per cent. By dint of extreme care in examining the fruit before it is put into store and also by virtue of gas storage, the spread of fruit-destroying rots is almost entirely avoided.

Further Developments

With due regard to the possibility of further developments, although the Association with its present facilities has accommodation for additional members, its building has been designed to provide for extensions and the adjoining land has been acquired.

Apart from its own members, the Association lends itself to contracting for the packing of fruit produced by outside growers, although all fruit thus packed comes under its marketing control.

There is considerable optimism among those concerned regarding the future development of cold storage of British produce under the conditions described. Such produce as cauliflowers, if stored in such a manner, might be of great benefit to the producer, as quantities of this vegetable would be made available to the consumer from mid-January to mid-November, the time when it is most scarce and expensive.

With regard to apples, it would seem that co-operative methods and refrigeration on the farms themselves have taken their place as an important factor in overcoming marketing problems. English apples are made available for a longer period of the year and gluts and shortages at any period avoided, which should benefit both the consumer and the grower.

Apple Juice and Fruit Syrups

(*Continued from page 155*)

black currant syrup (preferably canned on account of danger from poison gas) may become of great importance.

Medical Significance of Fruit Juices

Mr. Charley made some highly interesting references to the medical significance of juices and syrups, some of which had been obtained with some difficulty from Germany. Such troubles as a disease in children involving retardation of development and persistent anæmia, diabetes, etc., have been treated with apparent success. In this country, interest has been centred round cases in which patients suffering from hyperacidity with duodenal ulceration have been treated with black currant syrup. A group of children have also been given apple juice. Finally, a full report was given of apple-juice treatment of Pink disease, which was carried out under strict medical supervision at a Yorkshire hospital in 1937, using material supplied by the Long Ashton Research Station. Other cases were also cited and, in closing, Mr. Charley earnestly invited the co-operation of the medical profession to establish true facts regarding the therapeutic value of fruit juices.

Time Marches On in U.S.A.

In " well-informed circles " it is thought that frozen foods will cut into the canners' business, so far as it affects their institutional sales—that is to say, those organisations which buy the No. 10, or gallon can. It is not thought that quick frozen products will affect regular week-end sales.

It should be remembered that *fresh* fruits and vegetables can now be bought all the year round in the United States towns.

The canning of meats, soups and dog foods will not be in any way affected. In the latter, incidentally, all the big gains are coming out of the South African markets. Much of the meat packed as dog foods which is produced has actually passed the Federal Inspection. That is to say, it is meat fit for human consumption. We talked to a man who voiced the fact that he had eaten a quantity of a much advertised dog food with no appreciable ill-effects.

Dog business is growing very fast in America; there are nowhere nearly so many dogs per human head as in England, but it begins to look as if this condition of affairs may change.

We hear of at least one factory who are doing a satisfactory business canning fish food for cats. There are not so many cats in U.S.A. as in England per human head.

In Florida a man cans fishing worms. They are packed with a quantity of earth around them. We are told it is a growing business.

We referred elsewhere to a high velocity cold air for frozen fruits.

There is another process known as " Finnegan ", which operates on this principle and which is specially designed for frozen fruits in cans.

For orange juice, which is maybe the biggest line in fruit juices, a continuous freezing process appears to be proving the best. This is handled by the Food Machinery Corporation, whose agents in England are Mather and Platt.

There were eight million fewer bottles used in New York City last year than the year before. The trade has gone to cans.

JAM

The chief criterion of quality of jam is flavour, says E. F. EATON, *A.I.C.* This article explains how best the original taste of the fruit may be perpetuated by the use of appropriate raw materials and technique.

UNDOUBTEDLY the use of sugar as a preservative for fruit had its origin as a culinary art in the early stages of civilisation. It was evidently quite well known in the fourteenth century, as Professor Power, in her book *Medieval People*, mentions a passage from *Le Menagier de Paris*, that famous forerunner of Mrs. Beeton which was written in 1392. She says: "The cookery book ends with a section containing recipes for what the *Menagier* calls 'small things which are not necessities'. There are various sorts of jams, mostly made with honey; in the Middle Ages vegetables were evidently much prepared in this way, for the *Menagier* speaks of turnip, carrot and pumpkin jam". Later on, in 1787, Mr. John Farley, principal cook at the London Tavern, had published the fourth edition of his book *The London Art of Cookery and Housekeepers' Complete Assistant*. In it he devoted a section to the preparation of jam and fruit jellies which is quite remarkable for its comprehensiveness. In 1797, Mrs. Keiller of Dundee began making marmalade in her kitchen, and by her enterprise founded an industry for which Dundee is still famous.

What is Jam?

In spite of its antiquity as a household commodity and a subject of legal proceedings, the Law of England has always refrained from attempting in any way to define jam. Thereby it shows its great wisdom, because true jam is something to be appreciated rather than defined. Our dictionaries, on the other hand, with characteristic perseverance, do their best. The Oxford Dictionary, for instance, endeavours to arouse some pleasurable anticipation by telling us that "jam is a conserve of fruit, made by boiling it with sugar to a pulp". This is an exceedingly bad definition, but at least it contains the fundamental idea of preserving and implies the idea of flavour, and the possession of this attribute is the only justification of the use of jam as an article of our diet. It is almost invariably consumed as an adjunct to some other food, notably bread and butter or just bread. In its own humble way it contributes its quotum of calories to our daily total, but surely no man ever ate jam for its calorific value? Nor, for that matter, is he very much concerned with its sweetness or acerbity. What does interest him, however, and what he expects to find, is fruit flavour, and the very nature of jam demands that the chief criterion of quality shall be flavour. It cannot be denied, however, that other characteristics such as colour and set play their part, and it is therefore proposed to examine critically some of the factors upon which the quality and, in particular, the flavour of jam depend. Essentially there are three raw materials used for jam—water, sugar and fruit—all of which affect its characteristics.

Water

Water is frequently by no means the pure chemical compound we are in the habit of regarding it. In the London area and in the south of England generally, as obtained from town supply, it has an appreciable calcium content. Calcium salts, even in small concentrations, have a pronounced hardening effect on fruit, and this property is often utilised when strawberries, which are soft, are put down in sulphite, some or all of the sulphur dioxide being supplied as calcium bisulphite. Most manufacturers strive to keep whole fruit in their strawberry jam, and in order to ensure the penetration of the fruit by the sugar, add extra water and lengthen the time of boiling. In such cases the possibility of adding simultaneously a serious amount of calcium salts and consequently producing appreciable hardening should not be overlooked. Fortunately the calcium salts can be removed from water both cheaply and easily.

Sugar

Sugar can be obtained in all degrees of purity. Most manufacturers of high-grade jams consider that their

standard of quality can only be maintained by using best white sugar, and the author is in complete agreement with this. Inferior grades rarely produce that clean and distinctive appearance which is obtained from sound fruit and good white sugar. More important, however, is the fact that poor sugars frequently have an undesirable flavour, which is imparted to and may be accentuated in the jam. A caramel flavour is the most common.

Fruit

Fruit is also the most important and the most difficult ingredient, and usually the most expensive. It has been already postulated that the very existence of jam depends upon its flavour.

The difficulties inherent in fruit are legion, and often insuperable. Like all other biological material, fruit is not a standard product. A glance at the data on the chemical composition of fruits compiled by Macara and by Hughes and Maunsell reveals most disconcerting variations in every measurable constituent. From this it can only be concluded that those constituents which give rise to the fruit flavour and which cannot be determined quantitatively also vary in an equally disconcerting manner. In view of these variations it seems natural to enquire how the jam manufacturer evaluates this most important raw material and what factors he takes into consideration when he purchases fruit from one grower and rejects it from another. It would appear that the eye plays a leading part in influencing his judgment, and the nose and palate relatively minor parts. This seems quite wrong in principle, and the order of importance should be reversed. Harking back to the emphasis laid on flavour, fruit is not always what it looks—*e.g.*, Hampshire-grown strawberries, which command immediate visual attention, are notoriously lacking in flavour. The district in which the fruit was grown carries great weight, and in this respect manufacturers have their individual preferences. Generally speaking, Kentish strawberries are the most highly prized, while Evesham has the reputation for plums and Scotland for raspberries.

Varieties are Important

The varieties of fruit are also of great importance. For instance, Lloyd George is easily first favourite amongst raspberries, while Royal Sovereign leads the field in strawberries. The wise manufacturer makes it his business to learn something of the idiosyncrasies of the individual varieties, and black currants may be mentioned as a case in point. The two most favoured market varieties are Boskoop's Giants and Seabrooks. Both bear heavy crops of great merit, but there is one difference between these two which is of considerable interest to the jam maker. The individual currants formed on the clusters of Seabrooks ripen simultaneously. On Boskoop's they do not, and typically are ripest near to the stem with two or three green currants at the end of the cluster. As the fruit picker gathers entire clusters, this means that, other things being equal, Seabrooks are more likely to be uniformly ripe throughout a consignment.

Ideally the manufacturer would grow his own fruit, and this ideal has been achieved, apparently with great success, by at least one famous preserving house. Such an arrangement, together with the situation of the factory in close proximity to the fruit farm, obviously gives the manufacturer a tremendous advantage over his rivals.

Handling Soft Fruits

Another vital factor is the difficulty of handling, which is most acute in soft fruits. Such is the rapidity with which raspberries and strawberries will deteriorate that the slightest hitch in transport or factory organisation may easily result in considerable financial loss. Incidentally the mention of transport calls to mind an occasion, about five years ago, when a jam manufacturer who always insisted on having his fruit carried by rail was persuaded by his buyer to explore the possibilities of the much cheaper road transport. Accordingly, it was arranged that a load of strawberries should be despatched from Wisbech to the London factory, but unfortunately for the buyer there was some misunderstanding about the type of vehicle which had to be used. On the prearranged morning the strawberries arrived at the factory dead on time, but in an *insulated* van! Those strawberries never became jam.

Processing Technique

In the case of jam made from fresh fruit, the technique consists of one fundamental operation—namely, the evaporation of water. If, however, the fruit is in the form of sulphited pulp, this operation must be extended to include complete elimination of sulphur dioxide. It is not surprising, therefore, to find that few notable developments have taken place, and these have resulted from advances which have been made in the chemical and engineering sciences.

On the engineering side, the introduction of the internal steam coil was an important step towards increased production, but in spite of this, its use is not favoured by all manufacturers. It is of interest to record that a patent covering the use of a continuous evaporator was granted in 1934 (B.P. 411,185), but to the best of the author's knowledge this method has never been practised on a large scale. Much more important is the extent to which vacuum boiling is being developed. From the point of view of flavour, the use of vacuum is a great step forward, and it has met with much success in certain U.S.A. undertakings.

Chemists' Achievements

The remarkable achievements of the chemist in the field of jam manufacture during the twentieth century have given us a much better understanding of the changes which take place during the evaporation process, and have, to some extent, transformed the art of jam making into a science. In spite of the pre-eminent importance of flavour, the consumer of jam requires to be satisfied in certain other directions, and the manufacturer has been quick to realise the enormous benefits that

physical chemistry has bestowed upon him. As a result laboratory control is now a recognised feature in all progressive factories.

Undoubtedly, the major problems, until a few years ago, were concerned with set and mould growth. The factors which govern both of these phenomena have now been elucidated.

Just over 100 years ago, Braconnot established that the ability of fruits and fruit juices to form jellies when boiled with sugar depended upon the presence of pectin. Since then the study of pectin has formed the subject of much monumental research and has been associated with such names as Frémy, von Fellenberg, Ehrlich, Sucharipa, Schryver, Haynes, and Carré and many others.

*p*H Influences Quality

From the jam manufacturer's point of view, however, the contributions of Ogg in this country and Tarr in America are of immediate interest. It had long been recognised that satisfactory jellies only resulted when the pectin, sugar and acid contents fell simultaneously within certain limits. In 1922, Lal Singh[1] made a study of the effect of acid concentration and showed that with a constant amount of pectin the minimum amount of sugar required to produce a set could be decreased by increasing the acidity. Goldthwaite[2] had previously pointed out that the nature of the fruit acid influenced the jellying properties of pectin and stated that tartaric was superior to citric in this respect. Tarr,[3] however, showed that there was no direct relation between total acidity and jelly formation. He says: "We find that while the total amount of acid that is necessary for jelly formation may vary over a wide range, the hydrogen ion concentration is practically constant for a particular juice and varies only slightly for different juices . . . this definite hydrogen ion concentration is *p*H 3·46". Ogg[4] also arrives at the same conclusion. As hydrogen ion concentration can be measured with remarkable ease and accuracy, it follows that the manufacturer is now in the position of being able to work to predetermined limits of set in the same way as he can with total solids. Both workers demonstrated that the jelly strength decreased rapidly on both sides of the optimum *p*H and that, in addition, increase of acids beyond that required to produce this optimum value resulted in marked syneresis or, as it is called in the trade, "weeping". Thus it behoves the jam manufacturer to pay special attention to the question of *p*H, careful control of this factor being rewarded by direct financial gain and a more uniform quality.

Set Inhibits Mould Growth

The set of jam is quite important as a factor inhibiting mould growth. In 1927, Hirst[5] published the results of experiments which showed that when enough pectin was added to an acid sugar solution to give a firm set, less sugar was required to prevent mould growth. A firm set also prevented yeast from invading jam. It is now known that the osmotic pressure of the jam is the factor which controls mould growth. In general, the pressure exerted by a 65 per cent. sugar solution is sufficiently high to be safe, provided conditions of storage are satisfactory. The osmotic pressure of jam increases with increase of invert sugar content, and is decreased by commercial glucose. Glucose is very little used in jam in this country, but the advantage of having the maximum invert sugar content compatible with safety from crystallisation is obvious.

The control of invert sugar content has been greatly facilitated by the use of invert syrup. Experience has shown that under normal conditions of storage, soft crystallisation will not occur if the invert sugar concentration lies within the limits 25 to 40 per cent. When the invert sugar falls below 25 per cent., crystallisation of sucrose may take place, and this also is objectionable. By controlling the amount of invert sugar added to each boil and making due allowances for acidity of fruit, size of container into which the finished jam is to be poured, rate of cooling after pouring, etc., a well-directed laboratory can do much towards eliminating completely all crystallisation troubles.

Sulphited Pulp

When sulphited pulp is employed the manufacturer is under legal obligation to ensure complete removal of sulphur dioxide from the finished jam. This presents no difficulties, excepting in the case of black currants and strawberries. The tenacity with which these two fruits retain amounts of sulphur dioxide in excess of the allowed 40 p.p.m. is a source of constant anxiety to the manufacturer. Chemical control is imperative, not only to ensure that the preservative is removed, but also to keep a check on invert sugar contents, which may become excessively high as a result of longer boiling.

The possibility of sulphur dioxide as a preservative for fruit being discontinued altogether in the near future is an interesting speculation. The importance of fruit flavour in jam has been greatly emphasised in this article, and it cannot be denied that jam made from sulphited pulp can never compete in flavour with that made from fresh fruit. On the other hand, the flavour of fruit is practically unimpaired by cold storage, and jam made from such fruit cannot be distinguished from that made from fresh fruit during the season. Many manufacturers have been using cold storage on a small scale for a number of years, but recent developments have indicated much greater possibilities. In fact, it is wondered if we are rapidly approaching the day in which the "season" and sulphited pulps will be things of the past, and the jam boiler will practise his art on fresh fruit from one year's end to another.

The Laboratory, Crosse and Blackwell, Ltd., Bermondsey, S.E. 1.

References

[1] Lal Singh: *Industrial and Engineering Chemistry* (1922), **14**, 710.

[2] Goldthwaite: *Industrial and Engineering Chemistry* (1909), **1**, 333; (1910) **2**, 457.

[3] Tarr: *Univ. Delaware Agr. Exp. Sta. Bull. 134* (Tech. No. 2), p. 20 (1923). (See also Clayton's *Colloid Aspects of Food Chemistry and Technology*, p. 337 *et. seq.*)

[4] Ogg, W. G.: *University of Cambridge* (1924-5).

[5] Hirst, F.: *Ann. Rep. Agric. and Hort. Stn., Univ. Bristol* (1927), 150-6.

MAGNETIC SEPARATORS

AVOID METALLIC CONTAMINATION IN FOODS

H. E. HUTTER

THE PRESENT-DAY standards of food manufacture are so high that every precaution must be taken against any possible contamination.

The magnetic separator is invaluable in preventing contamination of the finished product by particles of iron or magnetic material. Apart from this feature, magnetic separators are essential in other applications both as regards protecting crushing and grinding plant from damage and as a means of preventing explosions and fire risks through sparking.

Tramp Iron

Tramp iron is a term used to cover iron parts, such as screws, nails, and nuts, which find their way into material delivered in bulk, or may become detached from machinery such as conveyors or elevators. In the case of grinding plant the entry of a piece of iron would cause considerable damage to the rotating parts, apart from the financial loss due to the consequent shut-down.

The fire risk is often a matter which requires special consideration; for example, the grinders used for finishing icing sugar are always provided with separators on the input side, as a spark caused by striking iron would be likely to cause an explosion.

Two Classes of Separators

Magnetic separators may be divided into two main classes: those which may be termed non-self-cleaning and the self-cleaning type. The first class is suitable for applications where a small amount of tramp iron is expected and the latter type where an amount exceeding, say, 3 per cent. may be found and also for the special case of feebly magnetic iron scale.

Apart from what may be termed the removal of large iron, such as small nails found in fruit and tea, the magnetic separator is capable of removing the fine particles such as are formed during grinding operations.

The Chute Type

The most common non-self-cleaning magnet is the chute type, which consists essentially of a tray carrying on its upper surface shaped bars over which the feed flows under the action of gravity. The bars are highly magnetised by coils which are mounted below the tray.

Various other types of chute magnets are employed, some having flat tops and being let flush into the bottom of feeding chutes. This type has been employed with great satisfaction in connection with flour chutes employed in a biscuit works.

A special type of chute magnet is made with a vibrating tray and is employed when the material to be handled is a very fine powder or where the iron contained in the feed is very fine.

Magnets can be made watertight, and an application of this is found in connection with a well-known fruit-washing machine in which the fruit is discharged almost singly and at high velocity, yet small pieces of iron such as nails can be easily extracted.

A further application is in connection with hand-picking of fruit, which is carried out on a large table. In this case a flush-type magnet is fixed across the table and as the fruit is passed over it in picking, any nails, etc., were very securely held.

A magnet, if properly designed, will work either above a feed of material or will pull through a considerable distance; separators of this type have been employed handling liquid chocolate, amongst other applications.

Many different classes of material are fed over chutes, some examples being powders, sugar, desiccated cocoanut, ground cocoa, tea, hot jam, etc.

Self-Cleaning Type

The self-cleaning class of magnets comprise magnetic drums and pulleys, the main difference from other types being that, in a drum, the complete magnetic system is rigidly fixed on a stationary shaft, around which rotates at a speed of 30 to 40 r.p.m. a cover supported on two enclosed end flanges running on bearings supported on the shaft. The magnet is so shaped internally that non-magnetic material fed on to the drum will pass straight forward, but any iron will be held tight against the drum face by magnetic attraction until it has passed under the drum well clear of the non-magnetic material when, partly under the action of gravity assisted by special shaping of the poles, it will automatically be dropped.

The face of the drum being highly magnetised and the feed being in direct contact with this face, the efficiency of extraction is very high and much higher than a pulley.

The Magnetic Pulley

The magnetic pulley is of similar construction except that the magnetic field extends the full circumferential distance, the magnet poles and coils in this case being attached to the shaft which in turn rotates in plummer blocks.

As the magnetic field extends over the surface of the pulley it is necessary to use a belt to enable any extracted material to be released. Even when the piece of iron has reached the point where the belt leaves the under side of the pulley the magnetic attraction is sufficient to hold it, but as the belt gradually leaves the pulley the action of gravity overcomes the weakening magnetic attraction and makes it fall off.

The ease with which a magnetic pulley can be installed either as a new plant or as an alteration to an existing conveyor makes it a very popular type of separator. The drum or pulley may be used for any application where the possible contamination or iron content is expected to be above 3 per cent. Typical examples of applications are conveyors handling cocoa beans, wheat, sugar, meat for chopping.

The most important application of magnetic separators in the food industry is undoubtedly in sugar refining. In the course of manufacture there is often a considerable contamination caused by scale from the pipes, and this is removed with the highest efficiency by drum-type separators.

A number of drums have been supplied handling quantities up to 60 tons per hour. In these cases the drums were 36 in. in diameter and with widths up to 54 in.; the weight of a complete drum would exceed 4 tons.

The largest magnetic drum in the world was manufactured in Birmingham and is used on a sugar plantation for protecting a shredder from damage caused by tramp iron entering with the cane. The drum is 36 in. diameter, nearly 11 ft. long, and weighs 7¼ tons.

Latest Development

The latest development is the application of high-pressure ventilation to magnetic drums, which enables an exceedingly high magnetic intensity to be obtained at the working face with consequent increase in efficiency.

The ability of a magnetic separator to remove a magnetic particle when it is embedded in a body of non-magnetic material is dependent on the magnetic particle being of sufficient section to enable the magnet to obtain a hold of sufficient pull to lift the weight of non-magnetic material. In a number of instances, such as patent foods, biscuits in dough form, etc., it is impossible with any form of magnet to extract a very small particle.

A Detector

A detector is now available which, operating in conjunction with a belt conveyor, will indicate and stop the conveyor when a magnetic particle is passed. The equipment can be set to indicate exactly where the particle is, and no manual attention is required except to restart after removal of the iron.

Chemical Society Dines

THE Anniversary Dinner of the Chemical Society was held at Grosvenor House, Park Lane, London, W., on Thursday evening, March 30, the President, Professor F. G. Donnan, C.B.E., D.Sc., LL.D., F.R.S., being in the Chair.

After the loyal toasts had been duly honoured, the Right Honourable Viscount Samuel, P.C., G.C.B., G.B.E., gave the toast of the Chemical Society and Professor Donnan responded.

Sir Robert Robinson, F.R.S., President-elect, proposed the health of the guests, the responses being given by Sir Albert Seward, President of the British Association for the Advancement of Science, and Dr. C. G. Darwin, M.C., F.R.S., Director of the National Physical Laboratory.

The kindred Societies were represented by a large number of distinguished guests, and Dr. H. J. T. Ellingham, Secretary of the Chemical Society, welcomed them in a convivial manner. It was left to W. A. S. Calder, Esq., President of the Institute of Chemistry, to acknowledge the toast on behalf of his compeers. The proceedings concluded with the induction of Sir Robert Robinson as President.

Among the large number of guests present were:

Bragg, Sir William, O.M., K.B.E., President of the Royal Society, Calder, W. A. S., President of the Institute of Chemistry, Carr, F. H., C.B.E., President of the Association of British Chemical Manufacturers, Darwin, C. G., M.C., F.R.S., Director of the National Physical Laboratory, Evans, E. V., O.B.E., Chairman of the Association of British Chemical Manufacturers, Eyre, J. V., President of the British Association of Chemists, Ferguson, A., President of the Physical Society, Gibson, A. J., President of the Oil and Colour Chemists' Association, Heilbron, I. M., D.S.O., F.R.S., Vice-President, Longstaff Medalist, 1939, Hothersall, A. W., President of the Electrodepositors' Technical Society, Jordan, L. A., Director of the Research Association of British Paint, Colour and Varnish Manufacturers, Keen, B. A., F.R.S., President of the Royal Meteorological Society, Kenyon, J., F.R.S.,, Vice-President, Lamb, W. R. M., C.V.O., Secretary, the Royal Academy, Le Maistre, C., C.B.E., Director the British Standards Institution, Leverhulme, the Right Hon. Viscount, Deputy President of the Society of Chemical Industry, McDermid, C., Secretary, the Institution of Mining and Metallurgy and of the Institution of Mining Engineers, McGowan, the Right Hon. Lord, K.B.E., Chairman of Imperial Chemical Industries, Ltd., Martin, T., General Secretary of the Royal Institution, Peters, R. A., M.C., F.R.S., Chairman of Committee, the Bio-Chemical Society, Philip, J. C., O.B.E., F.R.S., Vice-President, Pilcher, R. B., O.B.E., Honorary Secretary, the Chemical Council, and Registrar and Secretary of the Institute of Chemistry, Pooley, H. J., General Secretary, the Society of Chemical Industry, Colonel, J., D.S.O., President, the Institute of Brewing, Price, W., Master of the Worshipful Company of Salters, Rideal, E. K., M.B.E., F.R.S., President, the Faraday Society, Vice-President, Roach, A. T., Town Clerk, the Corporation of the City of London, Roberts, W. H., President of the Society of Public Analysts, Robertson, Sir Robert, K.B.E., F.R.S., Treasurer of the Royal Institution, Robinson, Sir Robert, F.R.S., President-elect, Robinson, Lady, Samuel, the Right Hon. Viscount, P.C., G.C.B., G.B.E., Senter, G., Principal of Birkbeck College, Seward, Sir Albert, For.Sec.R.S., President of the British Association for the Advancement of Science, Stirum, His Excellency Count J. P. van-Limburg, Minister for the Netherlands, Sugden, S., F.R.S., Vice-President, Thornley, S. K., President of the Research Association of British Paint, Colour and Varnish Manufacturers, Tizard, Sir Henry, K.C.B., F.R.S., Rector of Imperial College of Science and Technology.

Bennis Combustion, Ltd.—Correction

In our last issue captions were reversed underneath illustrations used in the article "Heat Losses at the Boiler-House". Fig. 1 was the Bennis Forced Air Draught Sprinkler Stokers, and Fig. 2, Bennis Coking Stokers at Nottingham Co-operative Dairy, Meadow Lane, Nottingham, instead of as shown.

FRUIT PULP

From a Special Correspondent

DUE to the shortness of the season for small and tender fruits which enter so largely into the manufacture of jam, it is impracticable to make use of large supplies as soon as they are available. Consequently, a method for keeping the fruit until such times as required has been found imperative. A quick, effective and cheap method of holding fresh fruit, even for fairly lengthy periods, is provided by the sulphur-dioxide process.

The use of this preservative is controlled mostly in England, and regulations do not permit the use of more than 2,000 parts of SO_2 to 1,000,000 parts of raw fruit in the case of strawberries and raspberries and 1,500 parts per million in the case of other pulps. It is a volatile substance and is driven off from the fruit during the process of cooking, only a very faint trace remaining.

For these reasons there is a somewhat extensive market in the United Kingdom for raw fruit preserved in SO_2, and total imports approximate 1,000,000 cwts. annually. The principal fruits in demand are strawberries, apricots, black currants and citrus fruits. Raspberries, loganberries, gooseberries and red currants may also be included, although the volume is small.

Imports during 1937 (the 1938 figures are not yet available) into the United Kingdom of strawberries, preserved without sugar, were chiefly from Holland, forming about 80 per cent. of the total. Probably last year's imports were pretty much in the same proportion.

Export prices are quoted f.o.b. Rotterdam, containers extra. Values fluctuate daily, being mainly dependent upon the volume of fresh fruit offered on the auction markets and on the quality of the berry for jam purposes.

The British Product

It has been the practice of United Kingdom manufacturers to send their own containers to Rotterdam to be filled with the processed fruit. These containers consist largely of oak barrels previously used in the oleo oil trade, the size preferred being 50 gallons, containing about 350 lbs. of fruit.

The processed fruit, purchased f.o.b. Rotterdam, casks extra, entails considerable expenditure before delivery to buyers. The f.o.b. cost is based on the gross weight of the contents of the barrel, including water and preservative; freight is charged on the gross weight of the container, and the duty per ton is chargeable on the gross weight of the contents. Allowing for these various factors, the cost per ton of actual fruit delivered in the United Kingdom, duty paid, is from £12 to £15 higher than the quotation f.o.b. Rotterdam. Thus berries quoted £20 per ton f.o.b. Rotterdam, casks extra, would cost over £30 per ton of actual fruit delivered, duty paid, in this country.

The United Kingdom in a normal year provides a considerable tonnage of fresh strawberries for jam purposes, many acres being cultivated under contract with the manufacturers. Generally speaking, the price is somewhat higher than for the imported processed fruit, and purchases are usually f.o.b. the farm. Unless the quantity of fruit delivered daily is greatly in excess of the capacity of the factory, all supplies are immediately turned into jam, and it is rarely necessary to hold surplus fruit by treating it with SO_2. The local supply of strawberries is a considerable factor in the jam trade, but apart from contracts the volume is indefinite and depends upon the demand in the fresh fruit market.

Frozen Fruit Pulp

Generally there is a limited market for peach jam. Small quantities are imported from Australia and Canada. There is, however, a good demand for apricot jam, and large quantities of sulphured apricots are imported annually, mainly from Spain. Apricot jam sells at a lower price level than other types, such as strawberry, raspberry, etc., and it is only by offering peach jam on a competitive basis with apricots that there can be any expectation of developing world-wide demands. Likewise there is little or no possibility of creating a demand for peach pulp unless it can be offered to compete with apricot pulp.

Efforts have been made to introduce frozen peach pulp on the British market. Although the product gave satisfaction to manufacturers, producing an excellent jam, little of the pulp could be offered at a price sufficiently low to attract manufacturers.

The success attained by pulp processed with SO_2 and the ease and cheapness with which such sulphured pulp may be sold, and stored for long periods, compared with the heavier cost of cold storage and transportation necessary to keep frozen pulp, has in the past rendered the sulphured product more economical. The sulphured pulp or the solid packs in gallon tins are preferred on account of lower cost; frozen fruit, while it may give superior results, needs to be offered at competitive prices and delivered in quantities suitable for immediate consumption, thus avoiding storage charges. Concerning the markets in the United Kingdom for fruit pulp generally, the demands of jam manufacturers are expected to remain fairly constant.

CORRESPONDENCE (*Continued from page 174*)

facturers that they will have to work in future to bacteria count limits of not exceeding 10,000 per ml. with *B. coli* absent in 1 ml. These count requirements have varied greatly, but in the majority not exceeding 50,000 per ml. as the highest limit. In every instance, the bacterial count is much lower than that suggested by Mr. Humphriss and fully emphasises the necessity of having a fixed standard more in consonance with the possibilities of manufacturing processes and the raw material employed.

Finally, standard technique for the taking and examination of samples of ice-cream for bacteriological counts is the first thing that should be established by the Ministry of Health. The trade as a whole would welcome any action that would put a common demand on all manufacturers of ice-cream, whereas it mistrusts wholeheartedly the effect of the powers whereby each local authority is a law unto itself.

Yours faithfully,

LONDON, LEONARD R. M. FELTHAM.
April, 1939.

The Editor.

SIR,

Your interesting paragraph in the April issue about our "Lymm-Pure-Salt" did it less than justice in several details. In the interest of accuracy, may we have a little of your space to correct the unfortunate impression which must have been created?

In your page you ascribed to "Lymm-Pure-Salt" a percentage of purity which we, as purists, would consider to be disgracefully impure. "Lymm-Pure-Salt" is 99·98 per cent. pure and is *guaranteed* to be so in the following words:

"We guarantee our 'Lymm-Pure-Salt' to be absolutely pure salt, containing 99·98 per cent. sodium chloride on dry sample. It contains no sulphate of lime (plaster of Paris), sulphate of magnesia, chloride of magnesia, chloride of barium, sulphate of soda, or any adulteration."

A curious point is that "Lymm-Pure-Salt" is the only salt in this country that is covered by such a guarantee. The reason is that the salt is made by a quite unique continuous process of such a nature that the quality always remains constant.

Your article said that "Lymm-Pure-Salt is being placed on the market", but actually it has been on the market for thirty-five years. "Born 1904 and still guaranteed pure", so to speak!

Again, you said that of the 900,000 tons of salt produced here every year 10 per cent. was of the dried vacuum type. The figure should be more nearly 17 per cent.

In the brief list of uses you mentioned we do not think you stressed sufficiently that the greatest demand for absolutely pure salt comes from manufacturers of food. The country still consumes more food than medicine—thank goodness!

Yours faithfully,

CHARLES MOORE AND COMPANY, LTD.
D. H. V. BOARD,
Director.

CEREAL CHEMISTRY

FRUIT AND VEGETABLE PRODUCTS

Two Standard Works Brought Up To Date

Modern Cereal Chemistry, *D. W. Kent-Jones, Ph.D., B.Sc., F.I.C.* (*Third edition.*) *vii+720 pp.* 30*s. net.*

The literature on the very wide field embraced by the elastic term " cereal chemistry " is not very great. The American journal *Cereal Chemistry* has now had a life of fourteen years, and a lot of valuable material is contained in the fourteen volumes, if one can only find it. It is, however, almost impossible adequately to index the various subjects dealt with in such a journal.

Other publications, such as the *Journal of the Ministry of Agriculture*, the *Canadian Journal of Research*, and the *Journal of the Society of Chemical Industry*, also contain valuable contributions to the subject, but anything in the nature of the textbook type of literature is scarce. We have, of course, Jago's classic, *The Technology of Breadmaking*, and Bailey's *Chemistry of Wheat Flour*, which, although valuable, are rather antiquated.

There are one or two minor efforts such as Duly's *Grain*, Swanson's *Wheat*, and Snyder's *Bread*. It must be remembered, however, that cereal chemistry is a young science, and discoveries have been tumbling over each other with such fantastic rapidity that any attempt at a classified textbook becomes out of date.

Fifteen years ago Dr. D. W. Kent-Jones, then almost a pioneer in this field, was brave enough to write a book on the subject, which he called *Modern Cereal Chemistry*. That was a worthy effort, and one that has proved of great value to every worker in the field of cereal chemistry who has taken the trouble to study it. Dr. Kent-Jones himself was probably the first to realise its shortcomings, and within three years he produced a second and enlarged edition. This can safely be described as the standard textbook used in most cereal laboratories during the last dozen years. Those years have been full of discovery, and an amazing number of papers have been published—some valuable, many useless. The task of sifting these was necessary. During the last decade we have seen the development of the mechanical side of flour evaluation, and such names as Chopin and Brabender have become familiar. In the same period efforts have been directed to the substitution of the chemical treatment of flour by physical methods of improvement—a branch with which Dr. Kent-Jones himself has been closely associated.

All these developments cried out for a new classification and a new textbook. Dr. Kent-Jones has supplied the need in his third edition of *Modern Cereal Chemistry*. The second edition had 446 pages, the third has 720. This in itself gives some indication of the extent to which the bringing up-to-date process has been applied. This latest edition contains entirely new chapters on dough testing machines; flour for purposes other than breadmaking; cereal and balanced rations for livestock; and the microbiology of cereals.

The author has to admit how difficult it has been to make a correct choice from all the work published in recent years, and to know what to include and what to exclude. As one whose task it has been to endeavour to keep abreast of recent publications on the subject, the reviewer has every sympathy with Dr. Kent-Jones in this respect.

Obviously it is possible to criticise such an ambitious textbook, and it is easy to find errors of omission. The reviewer is, however, going to refrain from any such criticism, and all he can say is that Kent-Jones has made yet another valuable contribution to his science and has placed at the disposal of his fellow-workers in the field of cereal chemistry the fruits of years of patient and industrious effort in a most unstinting and generous way, and, as one of those fellow-workers, the reviewer can only say " Thank you ".

T. H. F.

Commercial Fruit and Vegetable Products, *W. V. Cruess,* 1938. (*Second edition.*) *x+798 pp.* 36*s. net.*

This very comprehensive manual on the manufacture of fruit and vegetable products is rightly claimed to be " a textbook for student, investigator and manufacturer ". It deals with every aspect of the utilisation of fruits and vegetables, whether by drying, pickling, bottling, canning or by converting into candied fruits, jams, syrups, cordials or wines.

The book is thoroughly up-to-date, and embodies chapters on vitamins, plant pigments, enzymes of fruits and vegetables and the production of frozen pack fruits and vegetables.

Although written for the American producer, this book should be immensely valuable to the British manufacturer, and should prove a useful guide to the production of new lines for canning and preserving.

Important new developments in the preparation of fruit juices, cordials, syrups and wines are fully dealt with, and the chapter on the manufacture of jellies and marmalades contain a good *résumé* of recent researches on pectin.

Although the author's statement on the pectin content of various fruits does not entirely conform with tables published in this country, the differences are understandable if one realises the variations possible due to the state of ripeness and different varieties of fruit.

Each chapter is followed by a most useful and comprehensive bibliography, which should be especially valuable to the investigator.

The book is well produced and ilustrated, and can be thoroughly recommended as a standard treatise on food production, and should be in every library and on the bookshelf of those interested in this subject.

S. M.

New Method for Testing Meat Spoilage

On page 388, November issue of Food Manufacture, in a description of the preparation of permanganate solution for testing meat spoilage according to Drs. Strohecker, Vaubel and Kirchberg, it should be pointed out that the mixture of permanganate and concentrated sulphuric acid is extremely dangerous and if warmed explodes with great violence. Hence great care must be taken in handling it. Further, the words " *adding water to make one litre* " should read, " *adding TO water to make one litre.*"

CORRESPONDENCE

National Food Storage • Standards for Ice-Cream

Lymm-Pure-Salt

The Editor,

DEAR SIR,

The question of National Food Storage, whilst it has been exercising the minds of the responsible authorities since the Food Defence Plans organisation was established, has tended of late to fade out of the picture, at least so far as the public is concerned. In the event of war, whether this country is a combatant or not, food and stored-food supplies will take only second place in importance to armaments. It seems to us, therefore, both as individuals and as a company with a wide knowledge of foodstuffs and food preservation (if we may be pardoned this reference), opportune to raise again the question of National Food Storage.

We were informed last year that the Government had taken steps to purchase and store supplies of wheat, whale oil, etc.; and we would imagine that already difficulties both as regards finance and storage in a Government Storage Policy have become matters of some concern for the departments interested. In our opinion, at least, the policy of purchase and storage by a Government is a second best policy, and one that should only be resorted to in the face of an actual threat of war or during the operation of war.

When the Divisional Food Officers were appointed, we were informed that during hostilities the trade organisations concerned with the purchase and distribution of food would be used to the fullest possible extent, and this system was laid down as a definite policy.

In view of these various facts, we would like to put forward the proposal: "That the foodstuffs organisations in the country should be co-opted during peace time, in order to build up a large reserve of foodstuffs for use in the event of war." With a Government purchasing in peace time foodstuffs for storage, all sorts of technical problems arise—*e.g.*, as in the case of wheat, deterioration, millers' varying requirements of different types of wheat, etc. If the current foodstuffs trade organisation in the country were used as a medium for the purchase and storage of certain foodstuffs, then the troubles referred to would be largely eliminated.

Our proposal can be summarised very briefly as follows:

(*a*) First prepare, with the advice of experts, a list of foodstuffs for storage. These, for example, could include grain, whale oil, sugar, butter, lard, cocoa, bacon, frozen and tinned meat, dried milk, with perhaps maize and linseed for feeding stuffs.

(*b*) Arrange under the Divisional Food Officers for every importing and wholesale company or merchant concerned with the handling of the above items to be registered, together with details of the individual storage space available by each Company.

(*c*) Arrange for each registered company to carry twice or three times the normal stock of "storage commodities"—in times of uncertainty, arrangements could be made for individual companies to purchase and store four or five times their normal stocks of the commodities in which they specialise.

(*d*) The foodstuffs companies would be allowed to handle these stocks for trading purposes as if they were their own—*i.e.*, they would "feed" their retail customers from these supplies—the essential point of the whole system being that *stocks are kept turning over* and, therefore, fresh.

(*e*) As to finance—the Board of Trade, under the Essential Commodities Reserves Act, 1938, section 2, subsection 1, has already all the necessary authority to operate such a system. The subsection reads as follows:

> "The Board of Trade may, in accordance with arrangements approved by the Treasury, make payments by way of grant or loan to any trader concerned with an essential commodity for the purpose of inducing the augmentation of the stock of any such commodity held by him, or the improvement of the facilities available for the storage of any stocks thereof, which may from time to time be so held."

The Board of Trade, through its Divisional Food Officers, would organise a system, in conjunction with the banks, whereby the additional purchases could be financed and the storage paid for—*i.e.*, warehouse receipts for the purchase of stocks could be lodged with the banks by the companies storing the goods, and advances at pre-arranged low rates of interest made by the banks on all such warrants. The storage companies would be paid a nominal sum to cover rent, rates and taxes on storage premises. The total cost to the country would merely be the interest on the cost of the goods purchased and the rent of the premises where the goods were stored.

It is reasonable to assume that the banks would be only too pleased to lend on Government Guaranteed Food Warehouse Warrants several hundred millions of pounds from their present heavy deposits.

Such matters as the costs incurred by the Government we need not discuss at this stage, as this is a matter which could only be gone into by a board of experts duly appointed to examine the whole question. Similarly, such questions as market increases or decreases in price on goods so purchased—the regulation and availability of supplies, etc.—would also be examined by any such body of experts.

The broad principle, however, of the purchase and storage on Government Guaranteed Food Warehouse Warrants, through the present trade organisations in times of peace, is outlined above as a policy worthy of examination, and we submit, sir, with the greatest deference, that this is well worth the consideration of the authorities concerned.

We have the honour to remain, dear sir,

Your obedient Servant,

E. H. TAYLOR,
Managing Director.

Joseph Lingford and Son, Ltd.,
The Model Factory,
Bishop Auckland,
County Durham.

The Editor,

DEAR SIR,

The extremely fair and impartial manner in which the subject of chemical and bacteriological standards for ice-cream is examined in the article contributed by Mr. Eric Humphriss in your March issue deserves the commendation of all engaged in the manufacture of that product.

The question of chemical standards is one that in due course will have to be fought by the different sections of the trade concerned. The more immediate consideration in regard to the implications of the Food and Drugs Act, 1938, is that part dealing with bacteriological purity. Mr. Humphriss is to be congratulated both on his suggestion that a bacteriological standard should be established and on the leniency of the three-year step method he advocates.

His further suggestion that the limit of the *Coli aerogenes* group should be in relation with that required in milk on the basis of the relative solid content of the two products—milk and ice-cream—is also an extremely fair requirement during the initial period of the establishment of such standards.

Without the establishment of a bacteriological standard for ice-cream applicable to the whole country the trade will be in a state of chaos on the subject of the degree of purity required. The power of registration of premises used for the manufacture and sale of ice-cream with right to remove from the register given to local authorities seems to have produced the effect in the minds of some of the local sanitary departments that they have been granted dictatorial powers of interference with the trade accompanied with the right to make the most absurd demands.

Already this year instances have been brought to notice where local sanitary officers have told ice-cream manu-

(*Continued on page 172*)

NEWS FROM THE INDUSTRY

John Thompson (Dudley), Ltd., Represents Chisholm-Ryder Co., Inc., Niagara Falls, N.Y.

John Thompson (Dudley), Ltd., have recently taken up the sole representation for the British Isles and Dominions of one of the largest food machinery organisations in the U.S.A. — namely, Chisholm-Ryder Co., Inc., of Niagara Falls, N.Y.— whose products are distributed throughout the world.

Among the important items of plant manufactured by this company are, in the department of pea canning, viners and podding machines, and a new high capacity blancher. This blancher is a very special feature which works on an entirely novel principle, by which the peas are blanched throughout the day in perfectly clean water.

Another very interesting piece of plant made by the Chisholm-Rider Co., is a new type of exhaust box. This exhaust box is not of the disc type, and can be used both with steam and water and is capable of exhausting practically any size of can or bottle of any shape, either regular or irregular.

Other items include filling machines for fruits and vegetables, and all plant for fruit canning, covering retorts, temperature controllers, etc. Complete equipment for fish canning is also comprised in the machinery available.

As a result of the association of a firm of so wide a scope with one so well known in this country as John Thompson (Dudley), Ltd., who have had over a century's experience in food engineering and already cater for many requirements of the food industry, a very extensive range will be covered.

A valuable department connected with the activities of the John Thompson organisation is their advisory technical department, which is willing at all times to give assistance and advice to food manufacturers.

* * *

Turkey Drinks Fruit Juices

Turkey gave up drinking tea and coffee during her National Savings Week recently. Cinemas and public places were plastered with posters advocating the drinking of local orange and other fruit drinks instead of "international beverages".

At the end of the week the Turks returned to tea and coffee, as they are particularly fond of both these beverages.

Rotary Louvre Dryer

A very large list of commodities are already being treated by the Rotary Louvre Dryer, made by Dunford and Elliott (Sheffield), Ltd., of 54, Victoria Street, London, S.W. 1, and such differing materials as chalk and oil nuts, phosphate rock and blood can be dried.

The machine is applicable to the pre-heating, cooling and drying of all types of solid materials, whether coarse or fine, irrespective of size or moisture content. It is in use for drying material having an initial moisture content as high as 86 per cent., and reducing moisture contents down to as low as 0·01 per cent.

An experimental plant is available in London for demonstrating the efficiency of the Rotary Louvre Dryer to clients on their actual material, and is placed at their disposal without obligation.

* * *

A New Type of Convector

An entirely new type of convector, which has been introduced by the General Electric Co., Ltd., is designed to combine the most efficient heating principles with an artistic appearance. Three sizes are available, rated at 1,000, 1,500 and 2,000 watts respectively.

Convector heating is particularly suitable for use in offices, public halls and libraries, etc., while it may be regarded as the ideal heating unit for shops.

Illuminated Magnifier

A few years ago S. W. Partington was a horse-buyer in Rio Grande. Not infrequently the horses brought in by Indians suffered from mange, detection of which was not always possible on purchase as the period of development of the disease is sixteen days. Needing some device for examination deep into the capillary to see whether there was any life there, Mr. Partington constructed a double-lens magnifying glass fitted on to an ordinary electric torch. It did the job very well indeed, and many indignant Indians led their apparently unblemished horses away from Mr. Partington's compound.

It occurred to Mr. Partington, on his return to this country, that many applications could be found for his gadget in trades where close inspection is necessary. He set to work to perfect the device, and the result has been the marketing, in an extremely handsome and useful form, of the Partington Illuminated Magnifier.

The instrument consists of two powerful lenses mounted in a white plastic moulding into which a bulb from a standard battery torch throws illumination of an intensity of about 400 times that of daylight, giving perfect, shadowless visibility. An aperture in the side of the moulding enables forceps or other instruments to be used on the object under examination. Ebonestos, Ltd., have made an admirable job of the moulding, which consists of four separate parts. The aperture of the glass is wide enough to prevent eye-strain during continuous use, and it can be used in exactly the same way as an ordinary magnifying glass.

For the commercial exploitation of his invention—of which he has sold 9,000 in two months—Mr. Partington has given several sole agencies for distribution to particular groups of users. Osborne, Garrett and Co. handle sales to hairdressers; Indian sales will be looked after by John Bell and Croydon; while S. Maw, Son and Sons are responsible for retail sales through chemists.

* * *

Laboratory Removal

Owing to the demand for increased accommodation the Pascall Engineering Co., Ltd., are removing their London Laboratory and Test Station to more commodious premises at Hyde Street, London, W.C. 1. The change over will be effected as from May 1.

Dairy and Ice-Cream Equipment Club

The Annual General Meeting of the above Club was held on April 3 at the Hotel Washington, Curzon Street, London, W., and among the members who sat down to dinner were two honorary members, Sir William Manchester and Professor H. D. Kay, Director of the National Institute for Research in Dairying.

Mr. Rowland Arnison, the Chairman, remarked that the Club was found in January, 1938, and now had 124 members, representing upwards of 100 firms of repute. Various social events had taken place, special reference being made to the address given at the third dinner by Dr. Orr (Medical Officer of Health for Ealing) on "Efficiency of Dairy and Ice-Cream Equipment from the M.O.H.'s Point of View", and the discussion at the General Meeting in October on "Competitive Dairy Shows", which had resulted in the appointment of a special sub-committee, although so far no common ground for agreement had been found.

The following members of the committee were then re-elected *en bloc*: J. A. Coote (Nathan's Sales, Ltd.); A. Graham Enock (Graham-Enock Mfg. Co., Ltd.); Captain A. F. Gear (Creamery Package Mfg. Co., Ltd.); F. R. Humphrey (Dried Milk Products, Ltd); L. J. Hydleman (L. J. Hydleman and Co., Ltd.); P. K. MacKenzie (Enamelled Metal Products Corpn.); W. T. W. Parker (C.W.S. Dairy Equipment Works); E. A. Shepheard (U.D. Engineering Co., Ltd.); C. A. Wyatt (Aluminium Plant and Vessel Co., Ltd.); with the inclusion of Mr. F. J. Clarke, of Cherry-Burrell, Ltd., to fill the vacancy caused by Mr. Field's resignation.

* * *

Nickel in Industry

The Nickel Bulletin for February covers interesting ground in the use of all forms of nickel alloy. Nickel cast iron caustic pots and similar castings for chemical equipment are illustrated and described, and this product, having proved its value for the most arduous automobile work, is being applied in industrial processes. Brake drums in sugar refinery machines in nickel-chromium cast iron may be relied upon for long reliable life.

* * *

Hopkinson's Return Trap System

Savings in coal, boiler feed water and steam are, it is claimed, made possible by installing a Hopkinson's Return Trap system. The condensate from the steam traps drips from various points into a receiver and is immediately forced up into the return trap which then discharges it into the boiler.

At the first stage of the operation the trap is open to atmosphere so that the steam pressure can raise the water into the trap which is situated above the boiler level. As the trap becomes full a valve controlled by a float closes the connection to atmosphere and simultaneously opens the trap to full boiler steam pressure. Since the pressures in the boiler and trap are thereby equalised the water flows by gravity into the boiler.

The control valve consists of a series of discs mounted on a rotatable shaft and held against fixed flat seats. In opening and closing, the discs slide over the seats with uniform flexible pressure, ensuring even wear and keeping the faces free from sediment. The discs and seats are made from "Platnam," a high nickel-bronze which has great resistance to action of high pressure steam.

* * *

Rotenone Insecticides

Although there are other active principles in rotenone-containing plants and extracts whose presence cannot be completely ignored, the toxicity of such plants and extracts is due to a large extent to the chemical compound rotenone.

For horticultural purposes rotenone-containing preparations can be used in the form of ducts, extracts emulsified with water, and aqueous suspensions of very fine powders.

In market gardens lettuce, cabbages, peas, beans and other vegetables can now be sprayed without risk of coating them with a residue poisonous to human beings.

Although fumigation is usually adopted for serious infestation in greenhouses, the application of washes for small outbreaks is an economical alternative.

These and other applications, such as for orchards, forest trees, etc., are described in a booklet which should be of considerable interest not only to insecticide manufacturers but users of insecticides.

The booklet is issued by the laboratories of Stafford Allen and Sons, Ltd., of Wharf Road, London, N.1, who are manufacturing rotenone preparations in increasing quantities and claim to be the leading experts in the kingdom on this subject.

* * *

TWO BIG LIGHTING SCHEMES

A very interesting office lighting installation is that supplied by G.V.D. Illuminators, Ltd., to the new extension of the offices of Cerebos, Ltd., Willesden.

The new block comprises two office floors and a basement, and while each floor has been treated differently the lighting throughout is exceptionally even and well diffused.

In the basement semi-indirect lighting is used, but the resultant illumination is surprisingly free from hard shadows and glare.

Ceiling boxes of decorative design have been used on the ground floor, to blend with the panelling design of the ceiling, and on the upper floor efficient indirect pendants have been used.

Mr. R. W. Radburn, F.R.I.B.A., collaborated with G.V.D. Illuminators, Ltd., in planning the installation.

A lighting scheme involving more than two hundred fittings has been carried out at the premises of the Brightside and Carbrook Co-operative Society, Sheffield, with equipment supplied by the General Electric Co., Ltd. The installation, which was carried out by the Society's own electrical engineers, forms part of a vast scheme of alteration and extension.

The illumination of the boardroom presented an unusual problem on account of a movable ceiling of a kind which is believed to be unique in England. The room is divisible by lowering the centre portion of the ceiling and turning it on its side to form a wall. This wall is pivoted centrally; it can be revolved until it is horizontal and then retracted into the ceiling where it finally comes to rest between two beams.

It was desired to arrange the lighting so that it would operate efficiently whether the area was in use as one or two rooms. At the same time the centre section of the ceiling had to be ruled out as far as the location of light sources was concerned.

A satisfactory solution was found by installing two box-type fittings on each of the two sections of the ceiling at either end of the room unaffected by the movable portion. This lighting is augmented by recessed panel lights in the beams on either side of the central section. The box fittings are of chromium, with pink flashed opal glass and etched side panels, and each accommodates six 60-watt lamps. The recessed fittings, which were specially designed by the G.E.C., have champagne glassware and each takes four 100-watt lamps.

Agricultural Demonstrations

Under the direction of Sir John Russell, D.Sc., F.R.S., arrangements have been made at Rothamsted and Woburn Experimental Stations for demonstrations to be made to parties of farmers and all interested in agriculture in its practical, technical or educational aspects who may visit the plots at any convenient time between the beginning of May and the end of October.

The soil at Rothamsted is heavy loam, and modern experiments are concerned with the manuring of potatoes, sugar, beet, wheat, barley, mangolds, beans, flax, oats and clover, while suitable experiments are in progress on the light soil at Woburn.

There is ample material at each farm to occupy a full day, and all communications and requests to visit the stations should be addressed to the Secretary, Rothamsted Experimental Station, Harpenden.

Dry Egg Preservative

The use of "Oteg" facilitates the dry storage of eggs in any box for homes, hospitals, institutions, hotels, bakeries, etc. Eggs are dipped into "Oteg" thin liquid, and stored dry in any boxes with or without sections in any ordinary cool room. Oteg simply seals the pores of the shell, for ten months, for breakfast, boiling and all purposes. They also whip splendidly.

A plentiful supply of largest and most nutritive spring eggs in autumn and winter is possible at a cost of under a penny each.

Several thousand Oteg eggs were taken up Mt. Everest in 1936.

Household economy, and storage against time of shortage, never were more important than at present.

A descriptive booklet is issued on request by the suppliers Sozol (1924), Ltd., Dashwood House, Old Broad Street, London, E.C. 2.

The Royal Sanitary Institute

The Health Congress will take place at Scarborough from July 3 to 8, under the Presidency of the Right Hon. the Earl of Harewood, K.G., G.C.V.O.

Among the subjects of interest to the food and allied industries will be discussed the following:

Evacuation Schemes and the Health and Sanitary Problems Arising Therefrom.

The Position of the Veterinary Surgeon in the Larger English Meat Factories.

Practical Methods in Clean Milk Production.

Tuberculosis and other Important Diseases of Fowls.

The Financial Structure of the National Health Insurance Scheme.

Some Aspects of Sick Absence in Industry.

The Factories Act, 1937.

Whither National Health Insurance?

* * *

NORTH-EASTERN TRADING ESTATE

From the North-Eastern Trading Estates, Ltd., Newcastle-upon-Tyne, we have received some interesting facts about North-East sources of raw materials for the food industry.

Meat: The North-East maintains 2,000,000 sheep or one-twelfth of the sheep population of Great Britain. It also maintains 300,000 cattle for slaughter and milk. As a large port quantities of meat (foreign) are kept on hand to feed the ships, and the meat canning trade would have no difficulty in securing supplies imported at Newcastle wharves and not carrying rail freight charges.

Fish: Fish meal is already manufactured, and the North-East is the seventh largest port for wet fish, third for herring, and fifth for demersal fish. It is believed that the fish meal industry could be improved and would be stimulated by the establishment of consuming factories. There are heavy landings of shellfish and oysters, and fish preserving and paste industries might find Tyneside a convenient place for manufacture.

Poultry, Eggs, and Dairy Produce: The establishment of poultry farms for unemployed miners has increased the poultry industry, and although large herds of milking cows are already maintained the country is so rich in pasture that these could be increased. The Tyne is a large port of entry for Danish eggs, butter, and bacon.

Fruit and Vegetables: Climatic conditions might cause later maturity of fruit, although the nature of the soil is favourable. Vegetable growing has been greatly stimulated and exceedingly good results have been obtained from pod vegetables. There is no doubt that the canned vegetable trade could obtain supplies.

General: There are very large flour mills on the Tyne, and as Imperial Chemical Industries in South Durham produce a number of chemicals used in food manufacture these can be obtained easily. Manufacturers requiring raw material such as cocoa, sugar, spices, etc., would get supplies direct which would not be subject to further charges for rail freights. Cold storage is amply available. The water is very good, and a full analysis of this and other details can be obtained from the Publicity Officer, Metrovic House, Northumberland Road, Newcastle-upon-Tyne.

Absorbent Paper Towelling

In view of the new Factories Act, 1937 (42), which becomes operative on July 1st, the Harcraft Paper Towel Service for industrial use is of great importance. The stringent regulations embodied in this new Act are more than covered by the Harcraft Service, which presents the most hygienic contribution to the cleanliness of workers that has yet been produced.

Harcraft Towels (made by Harcraft, Ltd., Gipsy Corner, N. Acton, London, W. 3) are installed in a handsome, rust-proof cabinet, which holds at one filling 470 large-sized towels of exceptional quality, giving the maximum absorbency, softness and "wet" strength. They do not fuzz, lint nor disintegrate when in use, and leave the skin dry, smooth and clean.

A controlled-delivery mechanism dispenses these towels singly, no pilferage can occur, and wasteful use is virtually eliminated. From a hygienic standpoint it is important to note that the only towel the user can touch is the one that he or she withdraws from the cabinet.

The cabinet can be refilled with a full roll of 470 towels in three seconds. The cost of the Harcraft service is approximately 33⅓ per cent. less than the ordinary laundering service, and is immeasurably more hygienic and sanitary.

* * *

Aluminium and its Alloy

The large-scale production of aluminium and its alloys in Great Britain has from the outset centred mainly in the works of the British Aluminium Co., Ltd.

Alumina works, carbon factory, aluminium reduction works and rolling mills have for over forty years formed a complete chain, providing practically every industry with the light metal in any requisite form.

The principal forms used in industry are depicted in a booklet recently issued by the British Aluminium Co., Ltd., Adelaide House, King William Street, E.C. 4.

* * *

New London Landmark

It has been recently announced that the Gaiety Theatre has been purchased by Messrs. Crompton Parkinson, Ltd., one of the largest manufacturers of electrical equipment in this country, who propose to erect a modern block of offices on the site of the theatre.

Mr. Frank Parkinson, Chairman of the company, stated recently, "We realise that we have secured one of the most prominent positions in London, and mean to erect a building in every way in keeping with the site".

Successful Can Labelling

A handy little booklet on labelling has just been issued by National Adhesives Corporation. After some general information regarding the care of the labelling machine, use of adhesives, selection of labels, the various causes of poor labelling are analysed and put in tabular form.

Every conceivable trouble is epitomised, and concise instructions for remedying it are given.

This is a publication which should be in the hands of labelling executives and all others concerned with it.

The booklet will be forwarded gratis to any can labeller writing to National Adhesives, Ltd., Slough, Bucks.

* * *

Dust Problem

A Buell "Micro-Lector" Dust Separator will under peak-load conditions collect 4 tons of dust daily. Plant efficiency and output are greatly increased. It is claimed for the Buell equipment (Van Tongeren system) that it recovers dust which is valuable (or harmful) in industrial processes, prevents pollution of the atmosphere and extracts with the highest efficiency and utmost economy both coarse grit and fine dust particles over the entire range of dust concentrations. Suppliers are the Buell Combustion Co., Ltd., 49, Moorgate, London, E.C. 2.

A Large Range of Instruments

Details of a very large number of Indicating, Recording and Controlling instruments are given in Bulletin B.10 of Messrs. Negretti and Zambra.

Of particular interest to food manufacturers is the automatic cut-out for cooling water. Among the control instruments are those for humidity, temperature and pressure, etc., and recorders for pressure and vacuum, and hygrometers for combined temperature and humidity recording are mentioned.

There is a large range of thermometers for practically every purpose.

* * *

For Sugar Chemists

The Bausch and Lomb Saccharimeter has been designed in accordance with the specifications of a large number of sugar chemists. It is direct-reading in the international sugar scale (Bates-Jackson Conversion Factor), which is the scale universally accepted. In using this instrument no tables for conversion of scale readings are required.

The Bausch and Lomb Optical Co. has prepared an informative leaflet giving full details of this instrument, which cannot fail to interest sugar chemists.

* * *

A.R.P. PREPARATIONS

The catalogue prepared by Messrs. Frederick Braby and Co., Ltd., whose Head Offices are in Euston Road, N.W. 1, offers a complete guide to those wishing to provide A.R.P. shelters and accommodation, either for home, office or factory use.

The catalogue has been compiled for ready reference and is in four sections—namely, Shelters, Air Purification and Air Circulating Plants, Windows, Doors, Shutters and Emergency Exits, Accessories and Equipment.

* * *

Home Storage of Food Supplies

Distribution of a supplementary bulletin to the booklet on *The Home Storage of Food Supplies*, issued by the Canned Foods Advisory Bureau, starts this week.

Entitled *The Use of Reserve Food Store*, it instructs householders in "What Quantities to Buy" and "How to Use their Food Reserve".

It incorporates detailed notes on the keeping qualities of canned foods, diet sheets for emergency, suggested week's supplies of canned food for a family of four and suitable everyday recipes. It also includes useful educational facts about the nutritive value of canned foods.

All grocers who distributed the first bulletin (*The Home Storage of Food Supplies*) will receive a copy of the supplementary bulletin (*The Use of Reserve Stores*), and applications for supplies should be posted direct to the Canned Foods Advisory Bureau, Ltd., 248, Regent Street, London, W. 1.

A third bulletin, entitled *Home Storage of Food Supplies—What to Buy and How to Store*, embodying the contents of the bulletin *Home Storage of Food Supplies, and* the supplementary bulletin *The Use of Reserve Food Stores*, is in preparation. It is possible that grocers applying for either of the first two bulletins may be supplied initially with the composite booklet.

* * *

The Secretary of State desires to call attention to a Memorandum which is to be issued shortly by the Air Raid Precautions Department, calling attention to a general scheme of lighting restrictions to be enforced in the event of war. Occupiers of factories are recommended to obtain and study this Memorandum, but it may be pointed out that it is in no way inconsistent with the requirement of adequate and suitable lighting within the factory.

INFORMATION AND ADVICE

Canned Mushrooms — Black Mould on Internal Concrete Walls — "Corrected" Milk — Formula for Tomato Sauce — Oils of Lemon, Orange, etc. — Mayonnaise Manufacturers' Association — Cracking of Chocolate Digestive Biscuits — Manufacture of Cod Liver Oil Vitamin Concentrates — Cheese Biscuits — Information Supplied — Information Required

Canned Mushrooms

4,957. *I wonder if you would be so kind as to help me with regard to a query which I have received for details of the exports and imports of canned mushrooms in those countries that lead in the output of this product, together with the names of the principal shippers of canned mushrooms—that is, the exporters and importers. Details of the various duties chargeable on canned mushrooms exported from the United Kingdom, with particulars of any preferences which may be obtainable by such exports as against similar exports from other countries, are also requested.*

We would suggest that you might be able to get some information from the Import Duties Advisory Committee, Shell-Mex House, Strand, W.C., or perhaps from the Federation of British Industries, 21, Tothill Street, S.W. 1.

If the nature of the enquiry does not preclude it, an approach to some of the canners of mushrooms in this country might also be helpful. Some names of these were given.

Black Mould on Internal Concrete Walls

5,036. *In our creamery here we are experiencing difficulty in keeping the internal concrete walls properly painted. The difficulty seems to be that there is nearly always condensation on the concrete, and up till now we have found that paint only lasts about six to nine months before starting to peel off.*

Recently on some of the walls a black mould has appeared and rapidly spread over walls and ceilings. As we are keen to have the premises always smart, we shall be pleased if you could give us any advice as to the removal of the mould and names of suitable paints or paint manufacturers who could assist us.

With reference to your letter in connection with the difficulty experienced in keeping internal concrete walls properly painted, and asking for information on the problem of mould growth, we would refer you to an article in *Paint Manufacture* for October, 1937.

You might also like to obtain through this office a copy of the book by L. D. Galloway, *Paints and Mould Growth, Causes and Remedies* (price 2s.).

"Corrected" Milk

4,717. *In the November issue of* FOOD MANUFACTURE *I notice a reference on page 390 to "Corrected" milk. Would you kindly inform me where I could obtain further information about this product.* (London.)

The name of the inventor of "Corrected" milk was given.

Formula for Tomato Sauce

5,055. *Could you give us a recipe for making cheap tomato sauce from canned tomatoes, and mention any special equipment for manufacturing same?*

Formula for Tomato Sauce.

Tomato pulp, specific gravity 1·022	120	gal.
Sugar	70	lb.
Salt	13	,,
Vinegar, 100-grain	5	gal.
Onions, ground	13	lb.
Cinnamon, broken and sifted ..	2	,,
Cloves, headless	1	,,
Paprika	1	,,
Powdered mustard	2	oz.
Cayenne pepper	1½	,,
Cook to a finish of	55	gal.

After cooking to a proper density, the mix should be passed through a screen, 0·027-inch or 0·033-inch diameter, to remove tomato fibre and other foreign bodies. To obtain a stable product it is advisable to pass the sauce through a homogeniser, which will break it down to fine particles and prevent separation.

The names of firms supplying homogenisers and tomato pulp were given.

Oils of Lemon, Orange, etc.

5,103. *I have been requested by my Department in Adelaide to obtain, if possible, information covering modern methods of manufacturing the following: Oil of lemon, oil of orange, oil of mandarin, turpeneless oil of lemon, turpeneless oil of orange, concentrated pure fruit flavouring essence from raspberries and other fruit, and coffee essence.*

For information on the manufacture of oils of lemon, orange and mandarin, also turpeneless oils, we would refer you to an article by E. W. Borill, "Empire Production of Essential Oils", which appeared in *Manufacturing Chemist*, January, 1935, also "Synthetic Flavours", by Harold Silman, B.Sc., A.I.C., which appeared in FOOD MANUFACTURE, June, 1938. Regarding concentrated pure fruit flavouring essence, you will find some interesting details in this issue under the title "Apple Juices and Fruit Syrup". We gave the names of a number of firms manufacturing the latest type of plant for making coffee essence, and also for vacuum distillation plant or concentrating plant for the other products.

Mayonnaise Manufacturers' Association

4,957. *In an article in your periodical, No. 5, Vol. VIII, of May, 1933, on Mayonnaise, your writer refers to the "Mayonnaise Manufacturers' Association". I shall*

be extremely grateful to you if you will kindly furnish me with the address of the American and English Associations for the Manufacture of Mayonnaise. I am employed by a company in South Africa as maker of mayonnaise products, and having no facilities whatever to do some research work, I am entirely dependent on the information I can gather from pamphlets, etc. I shall, therefore, be very glad to get in touch with these associations so as to get an idea of the latest scientific data accumulated in this connection. (South Africa.)

We have to inform you that the Mayonnaise Manufacturers' Association is no longer in existence. Makers of this product now form part of the Pickle and Sauce Section of the British Food Manufacturers' Federation and the association's activities are devoted to price regulation. Making mayonnaise is chiefly a manipulative problem, and the makers of emulsifying and homogenising plant have done a good deal of research in this connection. We should be pleased to help if you have any specific difficulty on which you would like advice.

Cracking of Chocolate Digestive Biscuits

5,037. *Enclosed are a few samples of our Chocolate Digestive Biscuits, which have become cracked. Could you please let us know what is the cause of this cracking?* (Manchester.)

There are several factors which may be contributing to your present trouble: (1) The proportion of fat to flour may be too high for the type of flour you are using. It may be that a good deal of French flour is being used, which is still available at most attractive prices, but which possesses a poor glutin. With such flours less fat should be used. (2) Your baking may be rather slow—again due to a change in flour. A quicker baking is sometimes desirable. (3) The braking of the dough may be excessive. As you give no indication of what is being used it is impossible to put our finger on the actual trouble with certainty, but we think the flour is most probably at the root of the trouble.

Manufacture of Cod Liver Oil Vitamin Concentrates Machinery for extraction of Halibut Liver Oil, and making Gelatin Capsules

5,167. *We should like information as to commercial methods of manufacture of cod liver oil vitamin concentrates, together with equipment and names of manufacturers of such equipment and approximate costs, if possible. Also information as to commercial methods of extracting oils from fish livers such as those of halibut and tuna, together with names of manufacturers of equipment for such processes. Could you further give us the names of manufacturers of gelatin capsule making machinery for putting up vitamin-containing fish liver oils?* (Newfoundland.)

Names and addresses of firms supplying plant for the manufacture of cod liver oil vitamin concentrates and also plant for the extraction of oil from fish livers were given.

Cheese Biscuits

5,106. *We should appreciate the following information on the manufacture of cheese biscuits: 1. The type of cheese (presumably Cheddar) to be used, and whether same should be matured cheese or not. 2. The degree of fineness to which the cheese must be reduced, and best method of obtaining this fineness. 3. If it is necessary to have the cheese (after grinding) very dry. 4. If it is possible for cheese-flavoured biscuits to go rancid after manufacture, say after 14 days, and if so, how this could be avoided.* (Lancashire.)

1. Cheddar cheese can be used, and it can be matured or not; also part meat cheese might be suitable for some. The type of cheese used will influence the taste of the finished biscuits and it will depend on whether you want a pungent taste or otherwise.

2. The cheese must be ground up sufficiently to enable a smooth mixture to be obtained in the mixer.

3. It is not necessary to have the cheese very dry.

4. It is very unlikely that cheese-flavoured biscuits would go rancid after a period of 14 days. It depends, of course, on how the biscuits are treated after manufacture, but we presume that they would be put into suitable wrappers.

Information Supplied

4,793. *Could you give me particulars of the apparatus for peeling pickling onions, mentioned on page 73 of* FOOD MANUFACTURE, *February issue?*

Applicant was advised to get in touch with the Patent Office.

4,795. *Would it be possible for you to give me the names and addresses of the leading British manufacturers of coffee essences?*

These names were given.

4,958. *We shall be much obliged for any information you can give us as to the source of machinery for making macaroni and vermicelli.*

The name of a firm was given.

4,964. *We shall be pleased to know whether you can give us the names of suppliers of fish scales, either in a powdered preserved form or in the natural state in a liquid preservative. We believe that such products are available from Japan, but it is quite possible that supplies are obtainable on the Continent.*

We gave the name of a London firm whom we thought would be able to supply.

4,967. *We shall be glad if you can kindly give us the name and address of makers of a machine for peeling and cutting potatoes, the potatoes, after cutting, to be suitable for making crisps of any desired thickness.*

Names of manufacturing firms were supplied.

Information Required

4,952. *Information on how to prevent vinegar separating from the cream and settling on the bottom, if salad cream is kept in store for some time.*

4,907. *Any special treatment for keeping bay leaves the very deep green colour they are when placed in jars of filleted herrings, etc.*

4,990. *Information regarding the preparation of frozen eggs, as used by bakers; closure of the tins, temperatures, etc.*

World copyright in this feature is fully reserved. No extracts without permission.

RECENT PATENTS

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s. weekly (annual subscription £2 10s.).

Abstracts of Recent Specifications

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume, or in bound volumes price 2s. each.

Packing Cheese

A package is made of cheese by completely enclosing it in a sheet or film according to the parent specification. Pressure is applied to the film to bond it to the cheese and to seal the package. The packages may be enclosed in an outer wrapper of dry waxed crêpe paper before pressure is applied, and subsequently placed in a carton. The film may have indications printed thereon with aniline ink. The material permits the cheese to cure after enclosure. Specification 496,871 is referred to.

The specification as open to inspection under section 91 comprises also a description of the pre-treatment of the cheese before wrapping, and of various wrapping materials. The latter may comprise a sheet of paper, cellulose acetate, the substance known by the registered trade mark of "Cellophane", or similar material coated on one or both sides with the film material. The wax-rubber film may be replaced by other films having similar properties. This subject-matter does not appear in the specification as accepted.

496,870. Marathon Paper Mills Co. and Burgess, A. F.

Packages: Wrappers

Cheese is packed by enclosure in sheet material having a flexible, thermoplastic and pressure sealable film or coating of a homogeneous wax-rubber composition, according to the parent specification the film being adjacent to the cheese. The sheet material may be paper or a cellulosic film. In order to form a package, a blank 3 (Fig. 5) is placed in a box A with the coating inwards. End pieces 25, formed by folding a blank on the lines 28, 29, 30 (Fig. 3), are placed inside the body sheet 3, the molten cheese is poured in at a temperature of 150° to 165° F., and the upstanding flaps are folded down to form a completely sealed package. The box is closed and inverted so that any air in the package will work its way to the bottom of the package. The end caps may be placed outside the body sheet, and may be slit to render the folds 30 unnecessary. In another form the end pieces are integral with the body sheet, being joined along one end of a panel. Specification 496,870 is referred to.

The specification, as open to inspection under section 91, comprises also a reference to the use of various kinds of rubber, gutta-percha and their natural or synthetic equivalents in making the composition. The paraffin wax may be replaced by beeswax, spermaceti, candelilla, carnauba and the like. This subject-matter does not appear in the specification as accepted.

496,871. Marathon Paper Mills Co. and Burgess, A. F.

FIG. 3.

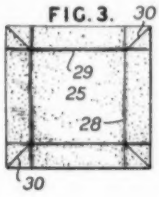
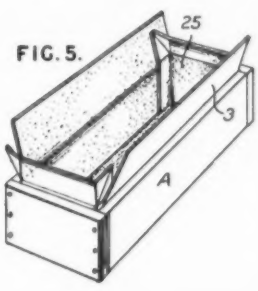


FIG. 5.



Apparatus for Preserving Fruits, Vegetables, etc.

Apparatus for preserving soft fruits, vegetables and other foodstuffs—*e.g.*, strawberries, peaches and tomatoes—comprises (Fig. 1) a carbon dioxide generator A, a gas reservoir B, from which the carbon dioxide is fed through a pressure regulator C and a dehumidifier D to the food storage chamber F. The gas in the storage chamber F is circulated by a fan 16 through a conditioning chamber E, in which are arranged perforated pipes 21 (Fig. 5), through which water can be sprayed on the gas, the force of the spray being regulated by means of adjustable shutters 25 operated by a handle 26, the chamber E having louvres 22 and corrugated partitions 23, between which the gas passes, and, below its bottom 20, a cooling pipe 19, through which cold water, circulated by a pump 30 or a refrigerant, is passed. A partition plate 29 is provided between the coils of pipe 19 to increase the path of travel of the gas in contact therewith. The carbon dioxide may be generated by the action of sulphuric acid on sodium bicarbonate, and may be supplied to the storage chamber at a pressure which is varied according to the class of fruit, etc., being stored and controlled automatically by regulator C. The dehumidifier D is divided by partitions into three independent compartments, each containing absorbent material —*e.g.*, absorbent cotton and chloride of calcium—to which the gas is supplied through branch pipes 1 to 3 with stop

FIG. 1.

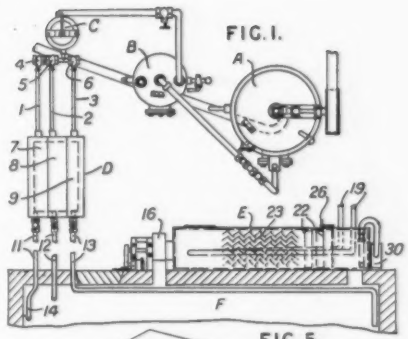
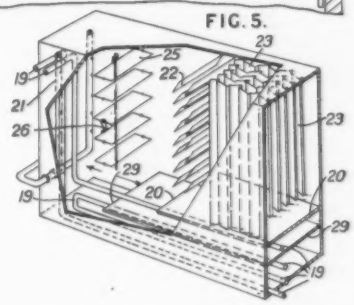


FIG. 5.



valves 4 to 6, the gas passing through pipes 11 to 13 to perforated distributing pipes 14. With relatively soft fruits and vegetables, such as strawberries, peaches and tomatoes, the gas is used dry and at a pressure little, if any, above atmospheric.

497,419. Payne, F.

Latest Patent Applications

4356. BIRCHALL, C.: Bin for grain, &c. February 10.

9047. BOURNEMOUTH ICE AND ICE-CREAM FACTORY, LTD., and CALDERWOOD, W. J.: Production of ice-cream wafers. March 22.

7660. CREAMERY PACKAGE MANUFACTURING CO.: Container-filling machines. March 9.

7627. PEARSON, C. W.: Process for preparing syrup for use in pineapple canning. March 9.

7422. KEENOK CO., LTD., and WALL, W. H.: Machines for separating the yolk from the albumen of eggs. March 7.

6874. JONES, C. R., and PALMER, R. W.: Storing of cereal flour, etc. March 2.

Complete Specifications Accepted

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at the uniform price of 1s. each.

502,368. WOLSELEY SHEEP-SHEARING MACHINE CO., LTD., and GEORGE, W. P.: Milk coolers.

502,324. BICKEL, W.: Preparation of beverage powders.

502,291. FISH MACHINERY CORPORATION: Method of and machine for filleting fish.

501,749. BRITISH WAXED WRAPPINGS, LTD., and BROWNE, R. J.: Composite wrapping material and method of making same.

501,496. KEIL, H. L.: Preparing liver extracts.

TRADE MARKS

AIRSPUN.—604,889. **Cake powders and aerating powders for use in the bakery trade.** FLETCHER AND PLUMMER, LTD., 29 and 31, Churchill Street, Newcastle-on-Tyne. March 29.

BEATRICE.—602,960. **Bottled and canned fruits, bottled and canned vegetables and edible oils.** ELDORADO LAND AND FRUIT CO., LTD., 4b, Frederick's Place, Old Jewry, London, E.C. 2. (Associated.) March 29.

BENLEAF.—604,407. **Edible oils and edible fats.** BENNINGA (MITCHAM), LTD., 33, Mortimer Road, Mitcham, Surrey. (Associated.) March 29.

BERVA.—603,682. **Bread and flour.** MONTGOMERIE AND CO., LTD., 174, West George Street, Glasgow. (Associated.) (By Consent.) March 29.

BLACK MAGIC.—603,571. **Malt.** ROWNTREE AND CO., LTD., The Cocoa Works, Wigginton Road, York. (Associated.) March 29.

BONDOXA.—601,092. **Meat extracts and vegetable extracts (for food).** BROOKE, BOND AND CO., LTD., Calcutta House, Goulston Street, Aldgate, London, E. 1. (Associated.) (By Consent.) March 15.

BOWSPRIT.—604,735. **Fish (except live fish).** POULTON AND NOEL, LTD., Belgravian Works, Bridge Road, Southall, Middlesex. March 29.

BROKO.—602,362. **Flaked maize, being a prepared cereal.** BROOKS (MISTLEY), LTD., The Maltings, Mistley, Manningtree, Essex. March 29.

BYNOVA.—602,059. **A preparation containing malt, milk, eggs and cocoa for use in making beverages.** ALLEN AND HANBURYS, LTD., Plough Court, 37, Lombard Street, London, E.C. 3. (Associated.) March 15.

CALAVO. — 572,630. **Oil for food.** CALAVO GROWERS OF CALIFORNIA, 4803, Everett Avenue, Los Angeles, State of California, United States of America. (Associated.) March 15.

COTSDALE.—604,411. **Milk, milk beverages (non-alcoholic), milk powder (for food), milk preparations (for food) and milk products (for food).** DOMINION DAIRY CO., LTD., Bicester Road, Aylesbury, Buckinghamshire. (Associated.) March 15.

CRYSTAL CROWN.—600,525. **Dried milk, milk powder (for food) and dried cream.** JOSEPH LINGFORD AND SON, LTD., 5, Durham Street, Bishop Auckland, Durham. March 22.

CUBS. — 587,013. **Cereal preparations made from whole wheat, being food for human consumption.** THE SHREDDED WHEAT CO., LTD., Welwyn Garden City, Hertfordshire. (By Consent.) March 29.

DEWDROP.—604,284. **Shredded beef suet.** JAMES DALY AND SONS, LTD., 30-34, Shandon Street, Cork, Eire. March 15.

EXTANO.—604,618. **Phosphate salt for use as an ingredient in food.** NAPHOS DISTRIBUTORS, LTD., 11, Broadwater Road, Welwyn Garden City, Hertfordshire. March 29.

GOLDEN SUN.—B 602,333. **Evaporated apples, evaporated apricots, evaporated peaches, evaporated pears, evaporated plums, evaporated fruit salad, dried currants, prunes, raisins and sultanas.** WM. BROWN AND CO. OF LIVERPOOL, LTD., 11 and 13, Victoria Street, Liverpool. (Associated.) March 1.

User claimed from March 17, 1900. Section 12 (2).

KAP.—603,812. **Fresh apples and fresh pears.** KENT APPLE AND PEAR GROWERS, LTD., 37, King Street, Maidstone, Kent. March 8.

MILKVALE.—604,628. **Tinned milk.** MACPHERSON, TRAIN AND CO., LTD., Adelaide House, London Bridge, London, E.C. 4. March 29.

MINIMIX.—601,083. **Preparations for making blancmanges, ice-creams, puddings, sauces and sweets and preparations of starch and sugar for use as food.** DRYFOOD, LTD., 11a, Bloomsbury Way, London, W.C. 1. (Associated.) March 29.

PHŒNIX.—603,463. **Sugar and golden syrup.** INGRIM BROS. (GLASGOW), LTD., 24/30, Sussex Street, Glasgow, S. 1. (Associated.) February 22.

REX.—603,287. **Non-alcoholic fruit juice beverages, squashes and cordials.** THE LONDON ESSENCE CO., LTD., 53, Glengall Road, Peckham, London, S.E. 15. (Associated.) (By Consent.) March 22.

SICILIAN JOY.—602,413. **Canned meat, canned fish, canned poultry, canned game, canned fruits and canned vegetables.** FRANCESCO BENIGNO and GIUSEPPE AND GRECO, Via Spasimo, 72, Palmero, Sicily. (Associated.) March 29.

It is a condition of registration that the mark shall be used only on goods canned in Sicily.

SILVER FLASH.—604,449. **Canned fish.** F. A. GOSSE CO., Smith Tower Annex, 151, Yesler Road, Seattle, Washington, United States of America; and BRITISH MERCHANTS INCORPORATED, LTD., 32, Lime Street, London, E.C. 3. March 15.

SUNTREK.—604,202. **Fresh fruits.** J. and H. GOODWIN, LTD., London Fruit Exchange, Spitalfields, London, E. 1. (Associated.) March 15.

WILD DUCK.—604,203. **Canned fish.** OVERSEAS PRODUCE TRADING CO., LTD., 57, Gracechurch Street, London, E.C. 3. March 1.

This list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal", and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

NEW COMPANIES

Boleyn Packing Company (1939), Ltd. (351352.) March 31. 215, Plashet Road, Upton Park, London, E. Food packers and mchts. £2,000. Dirs.: H. Gunson, 4, Green Moor Link, London, N. 21; A. A. Hooker, 10, Myddleton Gardens, London, N. 21; J. Gunson, 37, Granton Avenue, Upminster, Essex.

H. M. F. Faure and Co., Ltd. (351055.) March 25. Cunard House, Leadenhall Street, London, E.C. 3. Produce brokers and mchts. £75,000. Dirs.: Anna E. Faure, H. F. Faure and E. S. N. Faure, addresses not stated; J. C. A. Faure, 5, Pine Walk, Surbiton, Surrey; P. H. Faure, Captains, Great Hallingbury Rade, Bishop's Stortford.

Holden and Fenton, Ltd. (351509.) April 3, 1939. Mnfrs. of and dlrs. in cooked meats and prepared foods, etc. £3,000. Permt. dirs.: J. E. Holden, Sylecroft, Newchurch Road, Rawtenstall, Rosserdale; C. D. Fenton, Alder Dale, Newchurch Road, Rawtenstall.

Instant Frozen Foods, Ltd. (350931.) March 24. To carry on the bus. of mnfrs. of frozen food products in accordance with the Josephson Instant Freezing Process. £62,500. Dirs. to be appointed by the subs.

E. I. Michael and Co., Ltd. (351205.) March 29. 99, Regent Street, London, W. 1. Mnfrs. of and dlrs. in fruit juices, cordials, etc. £1,000. Dirs.: E. I. Michel, 17, Parsifal Road, London, N.W. 6; N. Alexander, 53, Stanhope Gardens, South Kensington, London, S.W. 7; Anna Michel, 17, Parsifal Road, N.W. 6.

Oriental Direct Imports, Ltd. (351136.) March 27. Bristol House, 19-20, Holborn Viaduct, E.C. 1. Importers and exporters of and dlrs. in foodstuffs of all kinds, grocers, provision mchts., etc. £1,000. Dirs.: M. Green, 46, Jessam Avenue, London, E. 5.

J. and L. Waite, Ltd. (350270.) March 6. Bakers and confectioners. £1,000. Permt. dirs.: J. Waite and Lilly Waite, 135, Main Street, Wilsden, Bradford.

H. Watmore, Ltd. (350900.) March 22. The Factory, Rear of 19, Lower Street, Cleobury Mortimer, near Kidderminster. Canners and bottlers of fruit, vegetables, sauces, jams, etc. £1,000. Dirs.: H. G. Hughes, 56, Witherford Way, Selly Oak, Birmingham; H. A. L. Hall, 97, Bournbrook Road, Selly Park, Birmingham.

The above-mentioned particulars of new companies recently registered have been extracted from the daily register of Messrs. Jordan and Sons, Ltd., company registration agents, Chancery Lane, W.C. 2.